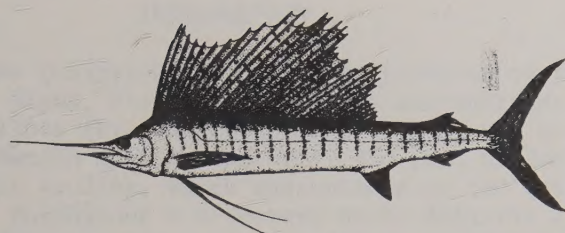


1976

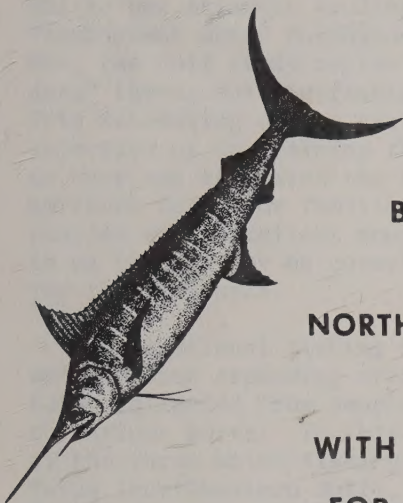
A



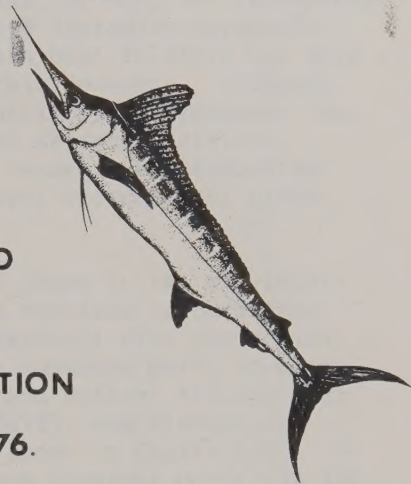
LIBRARY

JUN 7 1977

FISH & WILDLIFE SERVICE



**BIG GAME FISHING
IN THE
NORTHERN GULF OF MEXICO
DURING 1976,
WITH A BRIEF SUMMARIZATION
FOR THE YEARS 1971 - 1976.**



BY

PAUL J. PRISTAS

NATIONAL MARINE FISHERIES SERVICE
SOUTHEAST FISHERIES CENTER
PANAMA CITY, FLORIDA

APRIL, 1977



Digitized by the Internet Archive
in 2025

INTRODUCTION

As part of the Oceanic Game Fish Investigations of the Southeast Fisheries Center, Miami, Florida, this study concentrates on recreational fishing for billfishes (blue marlin, white marlin, and sailfish) in the northern Gulf of Mexico from Panama City, Florida, to Port Isabel, Texas. Unlike our Atlantic studies, which concentrate on the collection of "tournament data" throughout the western North Atlantic and the Caribbean Sea, the Gulf study relies on intensive daily sampling, as well as "tournament data" throughout the fishing season (April-May through September-October). This scheduling of the collection of catch/effort data best fulfills our main objective of determining the relative abundance of this resource. Although we have not estimated the total fishing effort for billfishes throughout the northern Gulf, our familiarity with fishing areas and seasonal activity, coupled with excellent cooperation from the fishing communities, indicates to us that we may be covering at least 70% of the total recreational effort for this resource.

Recreational fishing for billfishes in the Gulf began in the mid-1950's and has been expanding steadily. This expansion has resulted in much data being collected from people who fish a general geographical area but return to various ports. In this report, data collected at numerous ports in each of the three major fishing areas have been combined and reflect fishing from Texas (northwestern Gulf), Louisiana (northcentral Gulf), and Alabama and Florida (northeastern Gulf). These three areas are shown in Charts 1-12. In the northwestern Gulf, small amounts of data came from numerous ports and did not warrant separate listing. Consequently, these data are grouped and listed as Port Aransas from where most Texas data were collected.

Several other changes were made in this year's report. Sufficient data were collected from Grand Isle, Louisiana, and Orange Beach, Alabama, to show the catch/effort from these ports in Table 1. In previous reports, any data from these ports were included with South Pass and Pensacola data, respectively. For more comprehensive long-term results, data from 1971-1976 were combined for several analyses. These analyses are (1) hook rate by time of day, (2) effect of wind direction, and (3) number of billfishes raised-per-hour-of-trolling by area (10-minute latitudes and longitudes). Only combined data which resulted in 10 or more hours of fishing were included in these analyses. Another change was our indicator of relative abundance which had been the number of fish raised-per-hour-of-trolling. This year, relative abundance is shown as the number of fish hooked-per-hour-of-trolling. In the discussion of relative abundance, hook rates for the previous seasons are shown in Figure 7.

CATCHES

Table 1 shows the number of hours fished, the number of fish caught (including releases), the catch-per-hour, and the hours to catch one fish. A record of 17,684 fishing hours was recorded in 1976. This was a 22% (3,169 hr) increase over 1975, and a 47% (5,628 hr) increase over the average of the previous five seasons. More billfishes (1,236) were caught in 1976 than in any of the previous five years, with the catch-per-unit-of-effort



BLUE MARLIN

98.6

HOURS TO
CATCH A ---

SIZE RANGE
(POUNDS)

32.0 - 613.0

SEX RATIO
(M:F)

1:2.5

PEAK

5-6 A.M.

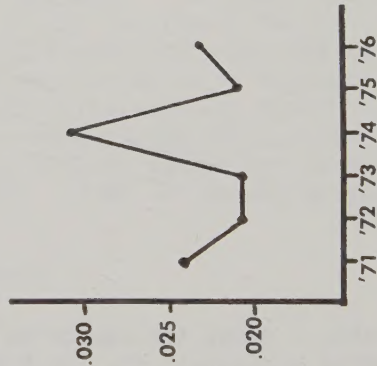
FEEDING

9-12 Noon

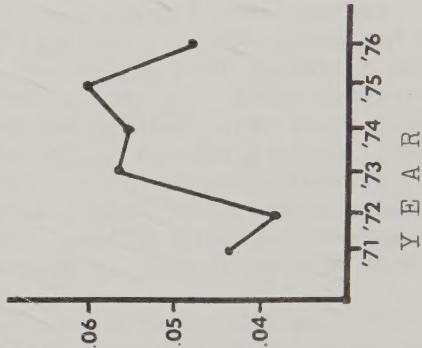
PERIODS

4-6 P.M.

RELATIVE
ABUNDANCE



HOOKED/HOUR



WHITE MARLIN

36.4

15.0 - 106.0

1:2.4

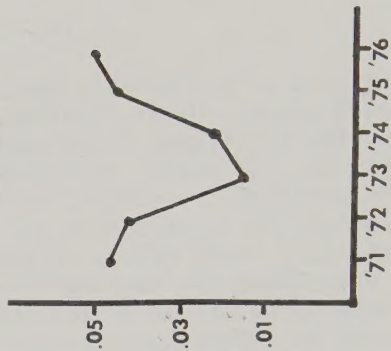
6-7 A.M.

10-12 Noon

5-6 P.M.

7-8 P.M.

HOOKED/HOUR



SAILFISH

42.9

1.0 - 95.0

1:1.7

6-7 A.M.

10-11 A.M.

2-3 P.M.

7-9 P.M.



(CPUE) or catch-per-hour-of-trolling second only to 1975. Of the 1,236 recorded catches, 6% (69) were landed in Panama City, 37% (457) in Destin, 10% (121) in Pensacola, 3% (35) in Orange Beach, 10% (121) in South Pass, 2% (23) in Grand Isle, and 33% (410) in Port Aransas. The highest CPUE for blue marlin (0.014) occurred at South Pass. The highest CPUE for white marlin (0.058) was at Destin. The highest CPUE for sailfish (0.089) was recorded from Port Aransas. When data from all areas were combined, the highest CPUE was for sailfish (0.031), followed by white marlin (0.028) and blue marlin (0.010). This differed from 1975 when white marlin were caught most frequently followed by sailfish and blue marlin.

The CPUE for each species and all species combined for 1971-1976 is shown in Figure 1. For blue marlin, the slight increase (0.001) in CPUE from the sharp decline in 1975 was encouraging. If the increase in number of hours fished we have recorded over the past several seasons is indicative of greater fishing effort, then this resource has apparently been able to tolerate increased pressure. For white marlin, the CPUE (0.028) declined after a record high in 1975. The catch rate (0.031) of sailfish was the highest in six years of data collecting. In 1976, 0.070 billfishes were caught-per-hour-of-trolling. This CPUE was only 0.009 less than the record CPUE in 1975. Considering the appreciable increase in hours fished in 1976 compared to the previous 5-yr average and that 1976 had the second highest CPUE, it appears that the northern Gulf of Mexico has been able to support a healthy sport fishery for billfishes.

WEIGHTS

Weights of the largest and smallest fish and the average weight for each species are given in Table 2. The largest blue marlin (613 lb) was landed at Grand Isle, with a 612 lb blue marlin landed at South Pass. These are the largest billfish we have recorded from 1971-1976. However, in the 1971 Gulf billfish report, a 686 lb blue marlin was recorded for South Pass in 1969. The largest white marlin (106 lb) was landed at Port Aransas and was reported to have tied the state record for that species. The largest sailfish (84 lb) was recorded at Port Aransas. The smallest fish of each species was landed at Destin during the 1976 season.

The average weights of each species from 1971-1976 are shown in Figure 2. The average weight of blue marlin in 1976 was 260 lb, only 4 lb less than the 1975 average but 28 lb more than the previous 5-yr average. The increased CPUE (Fig. 1) this season of comparatively large fish is a positive sign that this is a stable recreational resource. The average weight for white marlin was 53 lb, about 1 lb less than the 1971-1975 average and relatively stable. Sailfish averaged 44 lb in 1976. The 1976 record CPUE (Fig. 1) of fish whose average weight equalled the previous 5-yr average indicates that sailfish provide a very healthy sport fishery resource.

SEX RATIOS

Sex ratios for all fish examined in 1976 are listed in Table 3. Female blue marlin outnumbered males at all ports and overall by almost 3:1, a ratio similar to those for the last three seasons. Female white marlin were more numerous at four of the six ports where sex was determined and overall

outnumbered males as they have for all years for which we have data. Female sailfish outnumbered males at only three ports and overall were just slightly more numerous than males. The 1976 ratio of 1M;1.2F was the lowest ratio for the years 1971-1976.

HOOK RATE BY TIME OF DAY

As stated in earlier reports, we consider the striking at baits and lures by billfishes as our best indicator of feeding activity. To determine their feeding periods in relation to time of day, we used the number of fish hooked-per-hour-of-trolling by hourly periods. This year we combined data from the past several seasons. These data are given in Figures 3-6. Hourly periods of less than 10 hr of fishing are not included, with blank periods indicating no fish hooked during that period.

From 1971-1976 for the northern Gulf of Mexico, the most active periods for all species combined were between 1000-1200 hr (Fig. 3). In general, there were three prominent feeding periods: early morning, late morning, and late afternoon-early evening. These data for the combined years concur with the results reported last year. The more active feeding periods for blue marlin were about the same as for all species combined. The peak period (0500 hr) of activity resulted from less than 30 hr of fishing, and caution should be observed in making conclusions from these few data. The active feeding periods for white marlin coincided exactly with those for all species combined and, undoubtedly, greatly influenced the combined rates. In general, sailfish exhibited four peak feeding periods: 0600, 1000, 1400, and 1900 hr.

In the northeastern Gulf from 1971-1976 (Fig. 4), the pattern of feeding activity for billfishes closely resembled the results from the entire northern Gulf. Three main periods were apparent: 0600, 1000-1200, and 1800-2000 hr. The hook rate for blue marlin was highest at 0600 hr with lesser peaks in late morning and late evening. White marlin had three distinct active feeding periods: early morning, late morning to mid-day, and late afternoon-early evening. The peak activity periods for sailfish were almost identical to results from the entire Gulf, except the mid-afternoon period occurred at 1500 hr.

In the northcentral Gulf from 1971-1976, the hook rate for all species combined was highest from 1700-1800 hr (Fig. 5). Blue marlin and white marlin exhibited peak fishing activities during this same period. The hook rate for sailfish was highest during the 0600 hr period. However, only 60 hr of effort were recorded for this period compared to an hourly average of 1,806 hr for the other periods. The infrequent catches of sailfish made it difficult to determine feeding periods.

From 1972-1976 in the northwestern Gulf, billfishes exhibited two active feeding periods: 1000-1200 hr and 1700-1800 hr (Fig. 6). A low measure of effort (<50 hr) after 1700 makes us cautious about our conclusions regarding these periods. However, a steady increase in the hook rate from 1400-1800 hr indicates an evening feeding period. In general, blue marlin showed increased feeding activity from 1600-1800 hr and white marlin from 1700-1800 hr. Sailfish had two active periods: 1000-1200 hr and 1700-1800 hr.

EFFORT AND RELATIVE ABUNDANCE

The number of fishing hours sampled (effort) in the three northern Gulf areas and from each port are given in Table 4. Of the total effort measured (17,683.5 hr), 49% was in the northeastern Gulf, 29% in the north-central Gulf, and 22% in the northwestern Gulf. The two most active ports were Destin and South Pass with 27% and 25% of the total effort, respectively. The 3,953 hr listed for the northwestern Gulf represents combined data from numerous ports along the Texas coast but is listed as Port Aransas where most of the effort was measured.

Unlike previous reports, discussions of relative abundance herein will refer to the number of fish hooked-per-hour-of-trolling instead of the number of fish raised-per-hour-of-trolling. For comparisons between years, the hook rates for previous seasons have been calculated and are shown in Figure 7.

The apparent relative abundances of each species and all species combined for 1976 are given in Table 4. Blue marlin were most abundant in the north-central Gulf where the highest hook rate (0.034) occurred out of South Pass. White marlin were most abundant in the northeastern Gulf with the highest hook rate of 0.081 from Destin. The highest abundance of sailfish (0.148) occurred off the Texas coast in the northwestern Gulf. Of the three species, sailfish appeared to be most abundant for all areas combined followed by white marlin and blue marlin with hook rates of 0.048, 0.045, and 0.023, respectively.

From 1971-1976, the relative abundances of billfishes are shown in Figure 7. Even though our indicator of relative abundance has changed from raised to hooked, the abundance patterns derived from each indicator were similar. Blue marlin and sailfish increased in apparent relative abundance from their 1975 levels with the CPUE for sailfish greater than in any previous season. The relative abundance of white marlin declined sharply from the record high in 1975. For all species combined, the apparent relative abundance in 1976 was the second highest in the six years for which we have data.

Relative abundance for each of the three species is shown by monthly periods in Figure 8. Data from months in which there were less than 10 hr of fishing are not shown. In the northeastern Gulf, blue marlin were slightly more abundant in the second half of the season than during the first half which was different from the 1975 results. The high abundances in April and November may be misleading as less than 40 hr of fishing occurred in each month compared to a seasonal monthly average of over 1,000 hr. White marlin and sailfish were most abundant in July, the month of greatest effort (2,695 hr). In the northcentral Gulf, blue marlin were most abundant in June and appeared to be slightly more abundant (0.033) in the first half of the season than during the second half (0.030). White marlin were about equally abundant in July and October, however, the effort in July was almost 10 times that in October. Although the hook rates for sailfish in July and August were double those in June and September, these fish were not appreciably abundant in any month. In the northwestern Gulf, blue marlin were slightly more abundant in June than in any other month. White marlin were about equally abundant throughout the season. Sailfish were extremely abundant in September and very abundant in October.

BILLFISHES RAISED, HOOKED, AND BOATED

Data on billfishes raised, hooked, and boated are given in Table 5. Throughout the northern Gulf, fishermen boated or released 60% (1,236) of the 2,044 fishes hooked. Of these 2,044 fishes hooked, 51% (1,047) were in the northeastern Gulf, 14% (287) in the northcentral Gulf, and 35% (710) in the northwestern Gulf. The percentage of hooked fish boated or released was 65%, 50%, and 58%, for the northeastern, northcentral, and northwestern areas, respectively.

As in previous seasons, blue marlin were hardest to boat or release followed by white marlin and sailfish. For blue marlin, 44% of the hooked fish were boated or released in 1976 compared to 40% in 1975. For white marlin, the percentage was 64% in 1976 and 66% in 1975. For sailfish, 65% and 71% of the hooked fish were boated or released in 1976 and 1975, respectively.

EFFECT OF WIND DIRECTION

Data for several seasons have been combined to show the relation between wind direction and the number of billfishes hooked-per-hour-of-trolling in the northern Gulf of Mexico (Table 6). In the northeastern Gulf, six years of combined data showed the highest hook rate (0.134) occurred during periods of southwesterly (170-240°) winds. In the northcentral Gulf, after six years of fishing, the hook rates (0.63) were equal when winds were either from a northeasterly (340-70°) or northwesterly (250-330°) direction. However, there was nearly three times more effort recorded with northwesterly winds compared to northeasterly winds. In the northwestern Gulf, five years of data showed that fishing during periods of northeasterly winds was decidedly better than during any other period. When data from all areas and all years were combined, the greatest number of billfishes were hooked-per-hour-of-trolling during periods of northeasterly winds.

NUMBER OF FISH RAISED BY AREA

The numbers of billfishes raised-per-hour-of-trolling in 10-minute latitude and longitude squares are given in Charts 1-12. In the northeastern and northcentral Gulf data from 1971-1976 are combined, and in the northwestern Gulf data from 1972-1976 are combined. The fishing areas are outlined in black with blank squares indicating no fish raised. For comparisons with previous yearly reports, the 1976 data are given in Tables 7-9.

In the northeastern Gulf, a total of 68 squares were fished of which blue marlin were raised in 66% (45) of the area (Chart 1). Generally, these fish were most abundant from the 200-fathom line or beyond. One notable exception occurred in the southeastern section of the fishing area where a high abundance of these fish occurred within the 100-fathom line. White marlin were raised in 69% (47) of the area fished (Chart 2). All the areas showing mid and high abundances occurred from the 100-fathom line out. Sailfish were raised in 78% (53) of the area fished and were the most widely distributed of the three species (Chart 3). Highest abundance of these fish occurred within the 50-fathom curve. For all species combined, billfishes occurred in 90% (61) of the area fished from 1971-1976 (Chart 4). The maximum abundance of billfishes occurred beyond the 200-fathom line.

In the northcentral Gulf, blue marlin were the most widely distributed of the three species and occurred in 91% (60) of the 66 squares fished (Chart 5). These fish showed high abundances in areas of the 500-fathom curve or beyond. White marlin were raised in 88% (58) of the area fished (Chart 6). In general, this species was moderately abundant within the 500-fathom curve, with two of the three high abundance areas occurring beyond the 1000-fathom line. Sailfish were least widely distributed occurring in 59% (39) of the area fished (Chart 7). The maximum abundance of sailfish occurred inside the 100-fathom curve east of South Pass. For all species combined, billfishes were raised in 95% (63) of the area fished from 1971-1976. The maximum abundance of billfishes occurred beyond the 500-fathom curve.

In the northwestern Gulf, blue marlin were raised in 58% (36) of the 62 squares fished (Chart 9). The greatest abundance of these fish occurred southeast of Port Aransas in an area along the 300-fathom line. Blue marlin were most widely distributed in the area off Port Aransas where they were raised in 72% (29) of the 40 squares fished. White marlin were raised in 40% (25) of the total area fished (Chart 10). White marlin were the least widely distributed of the three species. More white marlin were raised-per-hour-of-trolling along the 300-fathom line east of Port Aransas than in any other area. Sailfish were the most widely distributed of all three species and were raised in 82% (51) of the area fished (Chart 11). Sailfish were extremely abundant in a 10-minute square area along the 30-fathom line off Port Aransas. However, sailfish appeared to be more widely distributed over the fishing area off the southern Texas coast than in the other areas. Sailfish were raised in 84% of the area fished off Port Isabel, and in 82% and 67% of the areas off Port Aransas and Freeport, respectively. For all species combined, billfishes were raised in 94% (58) of the area fished in the northwestern Gulf (Chart 12). The greatest abundance of billfishes occurred in the area where sailfish were most abundant, undoubtedly a direct result of the concentration of these fish in that area. Billfishes were raised in 97% of the area fished off Port Aransas, and in 89% and 67% of the areas of Port Isabel and Freeport, respectively.

OTHER INTERESTING FACTS

Some other interesting information noted from data collected in 1976 and not already mentioned is:

1. "Grand Slams" (i.e., catches of blue marlin, white marlin, and sailfish on one trip) were recorded at Destin and Orange Beach. Off the Florida coast, Capt. K. P. Burnette of the "Lo Boy" reported one in July, and Capt. Randy Davis of the "Caramia" brought one in during September. At Orange Beach, Capt. Tom Clark of the "Sun Circle" landed his "Grand Slam" in July.

2. Tuna offered much sport this year. For years, catches of yellowfin tuna were common off the Louisiana coast, but scarce or absent in other sections of the northern Gulf. This year, these fish were not only numerous in the northcentral Gulf, but catches of yellowfin tuna were also recorded from the northeastern and northwestern Gulf areas. In Texas, a state record

yellowfin tuna that weighed 155.5 lb was caught by Joey McCarty aboard the "Coeco." In addition to yellowfin tuna, two small bluefin tuna were caught in the northeastern Gulf.

3. Two longbill spearfish, Tetrapturus pfluegeri, were reportedly caught this season. At Destin, a 20.5 lb spearfish was brought in aboard the "Skylark." At Orange Beach, reportedly a spearfish was caught by Valerie Patrick aboard the "Drifter." However, the fish was removed before positive identification could be made, but this author saw a picture of the fish and believed it was correctly identified as a spearfish.

ACKNOWLEDGMENTS

We are grateful for the cooperation given by the anglers, charter boatmen, and officers of sport fishing groups: Organizers of the Texas Championship Billfish Tournament, and the Boatman's Association, Port Aransas; Jesse Edmundson, Freeport; Russ Wilhour, Key Allegro; Walter Fondren, Port O'Conner; Organizers of the Texas International Fishing Tournament, Port Isabel; Russell Cheramie and Myron Fischer, the Golden Meadow Big Game Fishing Club; Herman "Dutch" Prager, Jr., and Harley Howcott, the New Orleans Big Game Fishing Club; Ralston Reynolds, the Mobile Big Game Fishing Club; John Walker, the Pensacola Big Game Fishing Club; Al Clark, the Fort Walton Beach Sailfish Club; Royal Melvin, the Destin Charter Boat Association; and "Put" Putnam, the Panama City Boatman's Association.

To gather the 17,684 hr of fishing data, our port samplers conducted about 2,663 interviews throughout the season. In addition to their doing a find job, I thank: Monty Lopez, Port Aransas, for his help in the compiling and computation of data; Joe Yurt, South Pass, for his diligence in the collection of spine samples; Kareen Welch, Pensacola, for her efforts in sampling at additional ports; Jay Ogle, Destin, for handling the busiest billfishing port on the Gulf; and William Fontaine, Panama City, for his extra efforts throughout the season.

I express my gratitude to the following people whose services helped expedite this report: at the Panama City Laboratory, Ernest Anthony for data verification, Carl Saloman for the preparation of charts, and Carol Parker for the preparation of text and tables; and at the Pascagoula Laboratory, Dorothy Latady and her staff for the printing of this report.

TABLE 1.--NUMBER HOURS TROLLED, NUMBER OF RECORDED CATCHES, CATCH-PER-HOUR, AND NUMBER HOURS TROLLED TO CATCH ONE FISH, FOR BILLFISHES IN THE NORTHERN GULF OF MEXICO, 1976.

	Panama City	Destin	Pensacola	Orange Beach	South Pass	Grand Isle	Port Aransas	All areas Combined
Total Hrs. Fished	982.7	4,835.1	1,983.4	779.8	4,338.4	811.0	3,953.1	17,683.5
Number of Recorded Catches								
Blue Marlin	6	44	11	7	62	8	40	178
White Marlin	41	279	80	22	51	12	18	503
Sailfish	22	134	30	6	8	3	352	555
All Billfishes	69	457	121	35	121	23	410	1,236
Catch-Per-Hour								
Blue Marlin	0.006	0.009	0.006	0.009	0.014	0.010	0.010	0.010
White Marlin	0.042	0.058	0.040	0.028	0.012	0.015	0.005	0.028
Sailfish	0.022	0.028	0.015	0.007	0.002	0.004	0.089	0.031
All Billfishes	0.070	0.095	0.061	0.045	0.028	0.028	0.104	0.070
Hours Trolled to Catch a								
Blue Marlin	163.8	109.9	180.3	111.4	70.0	101.4	98.8	99.3
White Marlin	24.0	17.3	24.8	35.4	85.1	67.6	219.6	35.2
Sailfish	44.7	36.1	66.1	130.0	542.3	270.3	11.2	31.9
All Billfishes	14.2	10.6	16.4	22.3	35.9	35.3	9.6	14.3

TABLE 2.--RECORDED WEIGHTS (POUNDS) OF BILLFISHES CAUGHT IN THE NORTHERN GULF OF MEXICO, 1976.

	Panama City	Destin	Pensacola	Orange Beach	South Pass	Grand Isle	Port Aransas	All Areas Combined
Blue marlin								
Largest	318.0	461.0	443.0	460.0	612.0	613.0	467.0	613.0
Smallest	130.0	47.5	136.0	197.0	80.1	180.0	100.5	47.5
Average	189.8	223.3	242.1	259.5	309.2	325.7	232.5	259.6
White marlin								
Largest	68.0	83.5	68.5	61.8	93.8	81.0	106.0	106.0
Smallest	34.0	15.0	33.3	40.8	37.0	40.0	40.0	15.0
Average	47.5	51.5	51.8	48.9	59.0	57.4	57.9	52.6
Sailfish								
Largest	51.5	72.0	64.3	72.0	50.8	76.0	83.7	83.7
Smallest	26.0	7.9	12.0	35.5	25.5	36.0	8.0	7.9
Average	42.0	42.1	45.4	51.8	41.2	53.3	43.7	43.6

TABLE 3.--SEX RATIOS OF EXAMINED BILLFISHES CAUGHT IN THE NORTHERN GULF OF MEXICO, 1976. (M = MALES; F = FEMALES)

	Panama City	Destin	Pensacola	Orange Beach	South Pass	Grand Isle	Port Aransas	All Areas Combined
Blue marlin								
No. of M:No. of F	2:4	13:14	2:7	1:2	7:41	0	8:15	33:83
No. of M per one F	0.5:1	0.9:1	0.3:1	0.5:1	0.2:1	0	0.5:1	0.4:1
One M per No. F	1:2	1:1.1	1:3.5	1:2	1:5.9	0	1:1.9	1:2.5
White marlin								
No. of M:No. of F	17:12	27:55	20:41	4:3	5:35	0	0:7	73:153
No. of M per one F	1.4:1	0.5:1	0.5:1	1.3:1	0.1:1	0	0	0.5:1
One M per No. F	1:0.7	1:2.0	1:2.1	1:0.8	1:7.0	0	0	1:2.1
Sailfish								
No. of M:No. of F	4:14	11:22	12:9	1:1	2:4	0	50:42	80:92
No. of M per one F	0.3:1	0.5:1	1.3:1	1:1	0.5:1	0	1.2:1	0.9:1
One M per No. F	1:3.5	1:2.0	1:0.8	1:1	1:2	0	1:0.8	1:1.2

TABLE 4.--NUMBER OF BILLFISHES HOOKED -PER-HOUR-OF-TROLLING (RELATIVE ABUNDANCE),
AND NUMBER OF HOURS TROLLED TO HOOK A FISH IN THE NORTHERN GULF OF
MEXICO, 1976.

PORT	NO. OF HOURS TROLLED	NO. OF FISH HOOKED -PER-HOUR-OF-TROLLING HOURS TROLLED TO HOOK ONE FISH ()			
		Blue M.	White M.	Sailfish	All Billfish*
Northeastern Gulf	8,581.0	0.017 (58.8)	0.076 (13.2)	0.029 (34.9)	0.122 (8.2)
Panama City	982.7	0.015 (65.5)	0.072 (13.8)	0.030 (33.9)	0.117 (8.5)
Destin	4,835.1	0.020 (50.9)	0.081 (12.3)	0.034 (29.1)	0.136 (7.4)
Pensacola	1,983.4	0.012 (82.6)	0.072 (14.0)	0.021 (48.4)	0.105 (9.5)
Orange Beach	779.8	0.015 (65.0)	0.059 (17.0)	0.013 (78.0)	0.086 (11.6)
Northcentral Gulf	5,149.4	0.032 (31.2)	0.021 (48.6)	0.003 (321.8)	0.056 (17.9)
South Pass	4,338.4	0.034 (29.1)	0.020 (50.4)	0.003 (361.5)	0.057 (17.6)
Grand Isle	811.0	0.020 (50.7)	0.025 (40.6)	0.005 (202.8)	0.049 (20.3)
Northwestern Gulf					
Port Aransas	3,953.1	0.023 (43.4)	0.008 (131.8)	0.148 (6.7)	0.180 (5.6)

*Includes unidentified billfishes hooked.

TABLE 5.--HOURS TROLLED AND BILLFISHES RAISED, HOOKED, AND BOATED IN THE NORTHERN GULF OF MEXICO, 1976.

	HOURS TROLLED	BLUE MARLIN			WHITE MARLIN			SAILFISH			UNIDENTIFIED BILLFISH		
		R		B	R		H	B	H	R	R		H
Northeastern Gulf	8,581.0	237	146	68	1,199	651	422	335	246	192	21	4	
Panama City	982.7	15	15	6	72	71	41	26	29	22	1	---	
Destin	4,835.1	151	95	44	754	392	279	226	166	134	8	3	
Pensacola	1,983.4	52	24	11	284	142	80	65	41	30	11	---	
Orange Beach	779.8	19	12	7	89	46	22	18	10	6	1	1	
Northcentral Gulf	5,149.4	411	165	70	275	106	63	20	16	11	3	---	
South Pass	4,338.4	384	149	62	243	86	51	15	12	8	3	---	
Grand Isle	811.0	27	16	8	32	20	12	5	4	3	---	---	
Northwestern Gulf													
Port Aransas	3,953.1	141	91	40	50	30	18	1,115	587	352	18	2	
All Three Areas	17,683.5	789	402	178	1,524	787	503	1,470	849	555	42	6	
% of Raised		51.0	22.6		51.6	33.0		57.8	37.8		14.3		
% of Hooked		44.3			63.9				65.4		---		

R = Raised
H = Hooked
B = Boated

TABLE 6. HOURS FISHED, NUMBER OF BILLFISHES HOOKED, AND NUMBER OF BILLFISHES HOOKED-PER-HOUR-OF-TROLLING BY WIND DIRECTION IN THE NORTHERN GULF OF MEXICO, 1971-1976.*

Area	Wind Direction				
	North- easterly (340-70°)	South- easterly (80-160°)	South- westerly (170-240°)	North- westerly (250-330°)	Variable (Calm incl.)
Northeastern Gulf					
Hours fished	2,037.2	4,163.1	4,250.4	2,875.0	31,438.8
No. of fish hooked	247	478	568	361	3,819
No. hooked-per-hour	.121	.115	.134	.126	.122
Northcentral Gulf					
Hours fished	730.9	5,822.8	4,674.2	2,107.1	10,637.1
No. of fish hooked	46	333	248	133	553
No. hooked-per-hour	.063	.057	.053	.063	.052
Northwestern Gulf					
Hours fished	1,196.6	8,175.3	472.8	17.0	425.0
No. of fish hooked	248	1,187	46	2	79
No. hooked-per-hour	.207	.145	.097	.118	.186
All Areas Combined					
Hours fished	3,964.7	18,161.2	9,397.4	4,999.7	42,410.9
No. of fish hooked	541	1,998	862	496	4,451
No. hooked-per-hour	.136	.110	.092	.099	.105

*1972-1976 for Northwestern Gulf

TABLE 7.--NUMBER OF BILLFISHES RAISED-PER-HOUR-OF-TROLLING BY 10-MINUTE
SQUARES IN THE NORTHEASTERN GULF OF MEXICO, 1976.

New Sq	Old Sq	BM	WM	SF	All BF	New Sq	Old Sq	BM	WM	SF	All BF
F26	B4	----	----	----	.052	F82	E4	.025	.206	.043	.275
F27	B5	.011	----	.021	.032	F83	E5	.019	.153	.051	.224
F28	B6	----	----	----	----	F84	E6	.045	.109	.045	.199
F42	C2	----	----	----	----	F85	E7	----	.305	.102	.406
F43	C3	.018	.092	.010	.124	F86	E8	.061	.102	.041	.204
F44	C4	.020	.032	.027	.081	F100	F1	----	.214	----	.214
F45	C5	.016	.070	.016	.109	F101	F2	.040	.080	----	.120
F46	C6	.022	.045	.067	.134	F102	F3	.036	.066	.036	.143
F61	D2	.019	.096	.019	.134	F103	F4	.029	.272	.056	.360
F62	D3	.023	.117	.030	.172	F104	F5	.027	.123	.082	.233
F63	D4	.039	.172	.043	.256	F105	F6	.064	.111	.254	.429
F64	D5	.012	.056	.032	.104	F106	F7	.029	.087	----	.116
F65	D6	.029	.135	.010	.174	F122	G3	----	.190	.063	.253
F66	D7	.034	.102	.034	.171	F123	G4	.070	.140	----	.211
F79	E1	----	----	----	----	F124	G5	.137	.137	.091	.365
F80	E2	.020	.074	.007	.101	F122	G8	----	.077	----	.077
F81	E3	.030	.133	.039	.202	F145	H6	.043	.730	.086	.858

BM = Blue Marlin

WM = White Marlin

SF = Sailfish

BF = Billfishes (includes unidentified)

TABLE 8.--NUMBER OF BILLFISHES RAISED-PER-HOUR-OF-TROLLING BY 10-MINUTE
SQUARES IN THE NORTHCENTRAL GULF OF MEXICO, 1976.

New Sq	Old Sq	BM	WM	SF	A11 BF	New Sq	Old Sq	BM	WM	SF	A11 BF
L21	L23	.147	.147	----	.294	L71	L47	.062	.071	.002	.135
L34	L28	.092	----	----	.092	L72	L48	.069	.040	----	.108
L35	L29	.053	----	----	.053	L73	L49	.069	.012	----	.081
L36	L30	.045	.045	----	.091	L74	L50	.040	.027	----	.067
L37	L31	.073	----	----	.073	L75	L51	----	.060	----	.060
L38	L32	.084	----	----	.084	L83	G30	.112	----	----	.112
L48	G17	.027	.027	.041	.096	L84	G29	.040	.040	----	.081
L51	L36	.036	.024	----	.061	L85	G28	.061	.067	.006	.133
L52	L37	.136	.052	.010	.198	L86	L53	.082	.041	----	.123
L53	L38	.069	.053	----	.123	L87	L54	.153	.047	----	.211
L54	L39	.086	.072	.004	.164	L88	L55	.107	.025	----	.132
L55	L40	.071	.051	.005	.127	L89	L56	.074	.042	----	.116
L56	L41	.062	.062	.016	.140	L90	L57	.088	.033	.011	.132
L57	L42	.190	.127	----	.316	L91	L58	.106	.042	----	.149
L64	G25	.083	----	----	.083	L92	L59	.138	.138	----	.276
L65	G24	.041	.041	.006	.088	L103	G34	----	----	----	----
L66	G23	.056	.049	.006	.117	L104	L62	.084	.017	----	.100
L67	G22	.070	.087	----	.157	L105	L63	.033	.033	----	.066
L68	L44	.077	.026	.013	.115	L106	L64	.073	.036	----	.109
L69	L45	.113	.070	----	.182	L107	L65	.175	.075	----	.251
L70	L46	.085	.045	.004	.134	L108	L66	.122	.081	----	.203
						L109	L67	----	----	----	----

BM = Blue Marlin

WM = White Marlin

SF = Sailfish

BF = Billfishes (includes unidentified)

TABLE 9.--NUMBER OF BILLFISHES RAISED-PER-HOUR-OF-TROLLING BY 10-MINUTE SQUARES IN THE NORTHWESTERN GULF OF MEXICO, 1976.

Sq	BM	WM	SF	A11 BF	Sq	BM	WM	SF	A11 BF
T45	----	----	----	----	T158	.049	.005	.477	.537
T58	----	----	.162	.162	T159	.036	----	.078	.114
T74	----	----	.141	.141	T160	.091	----	.055	.146
T118	----	----	.083	.083	T161	.071	----	.095	.213
T120	----	----	.097	.097	T163	----	----	.167	.167
T121	.028	----	.028	.071	T168	----	.074	----	.074
T122	.044	----	.044	.088	T170	----	----	----	----
T123	----	.028	----	.028	T200	.067	----	----	.089
T124	.063	.003	.016	.085	T258	----	----	----	----
T125	.053	.015	.046	.114	T259	----	----	.043	.043
T126	.336	----	.067	.403	T261	----	.074	----	.222
T127	.070	----	----	.070	T277	----	----	.054	.054
T131	.120	----	.151	.271	T278	.047	.016	.079	.142
T132	.055	.165	.495	.714	T279	.051	----	----	.051
T137	----	----	.192	.192	T297	----	.013	.156	.169
T138	.011	.006	1.055	1.073	T298	.035	.035	.105	.184
T139	.042	.004	.146	.192	T313	----	----	.032	.032
T140	.065	.043	.065	.173	T314	----	----	----	----
T141	.055	.024	.047	.142	T315	----	----	----	----
T142	.023	.023	.023	.091	T316	.018	.018	.176	.211
T143	.064	.024	.008	.104	T317	.032	.032	.032	.096
T144	.031	.063	.063	.157	T333	----	----	.250	.250
T145	----	.185	.324	.509	T334	----	----	----	----
T147	----	----	.238	.238	T335	.023	----	.209	.233
T148	----	----	.103	.103	T336	----	.037	.220	.256

BM = Blue Marlin

WM = White Marlin

SF = Sailfish

BF = Billfishes (includes unidentified)

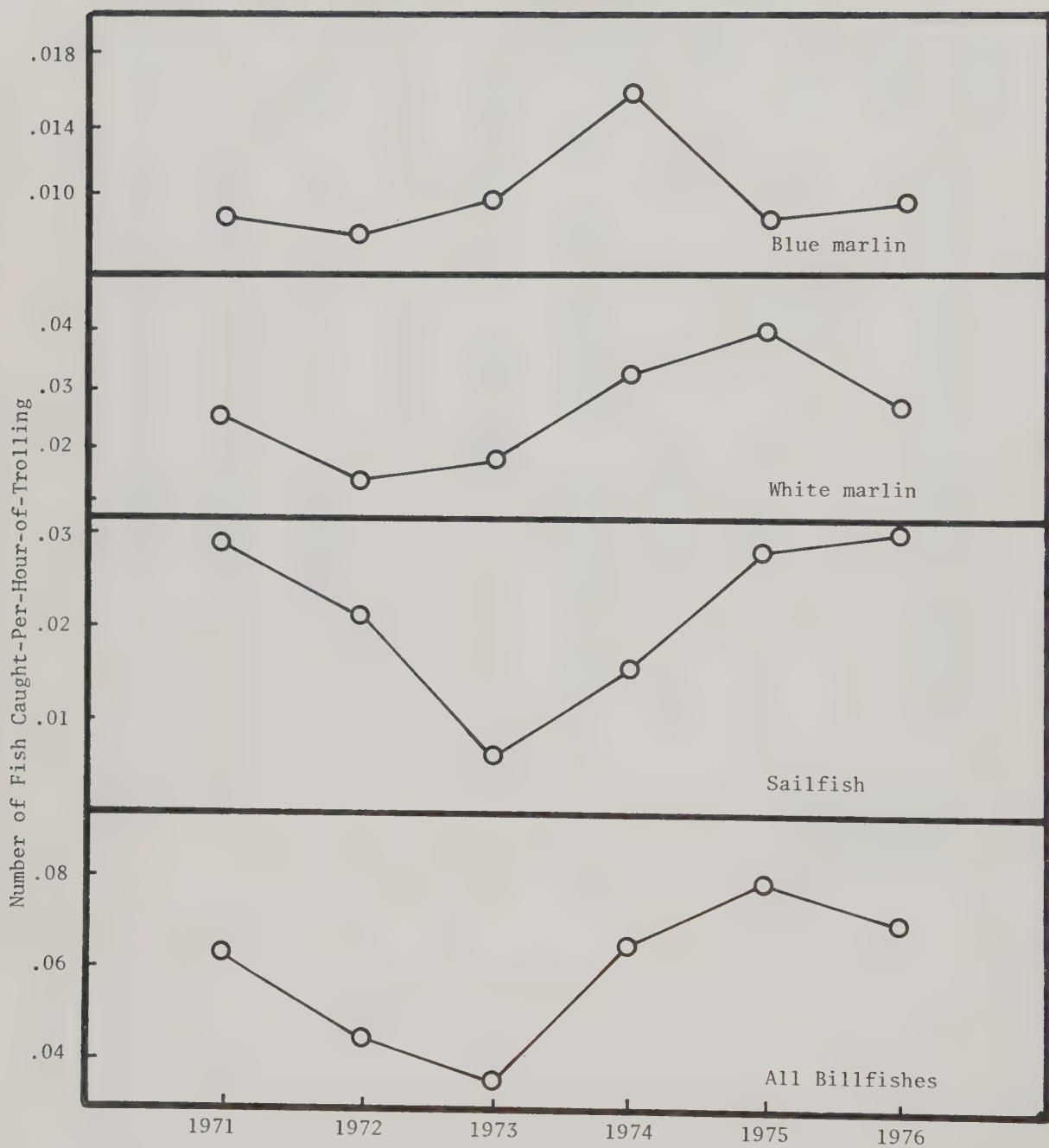


Figure 1. Number of billfishes caught-per-hour-of-trolling in the northern Gulf of Mexico, 1971-1976.

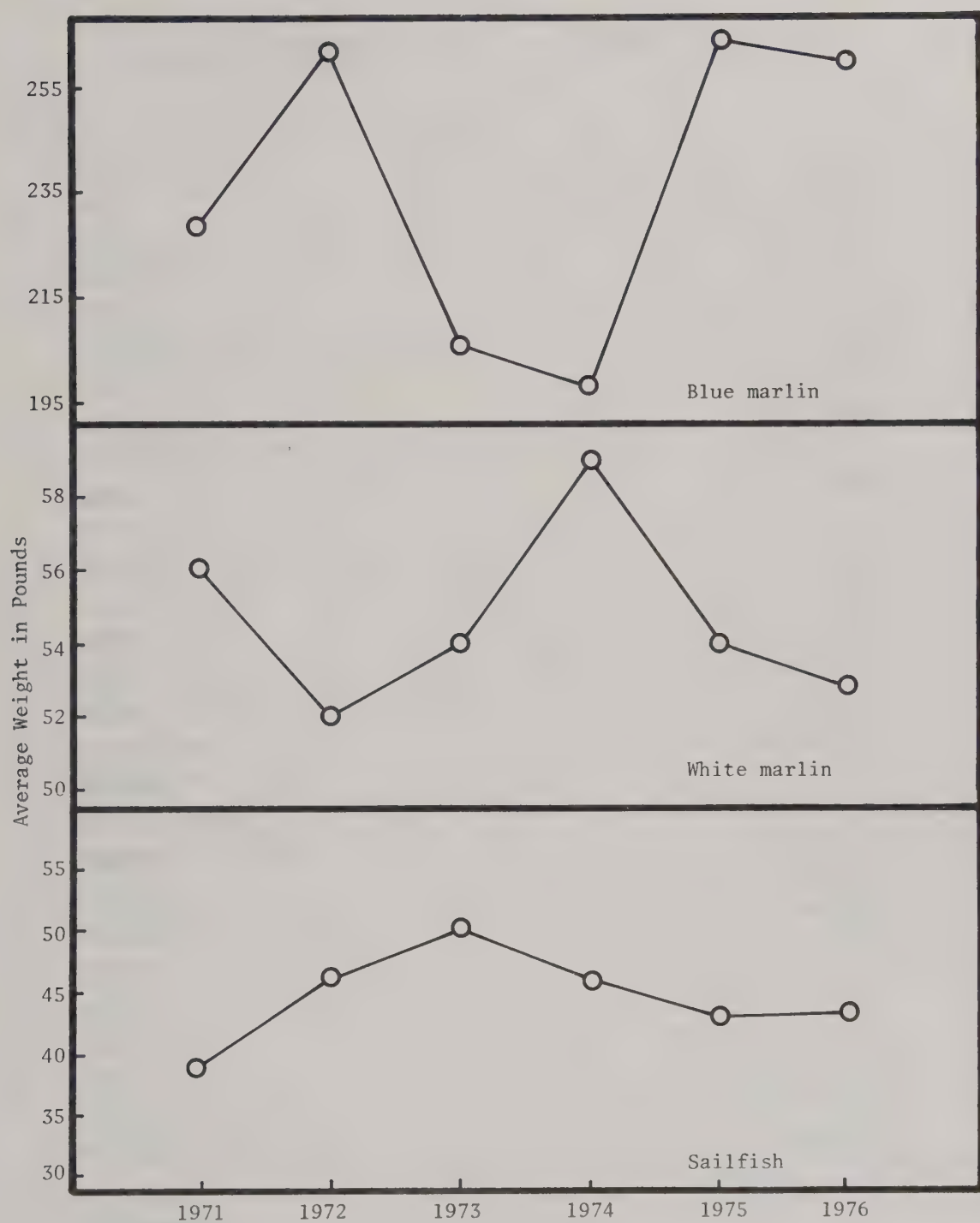


Figure 2. Average weights (pounds) of billfishes in northern Gulf of Mexico, 1971-1976.

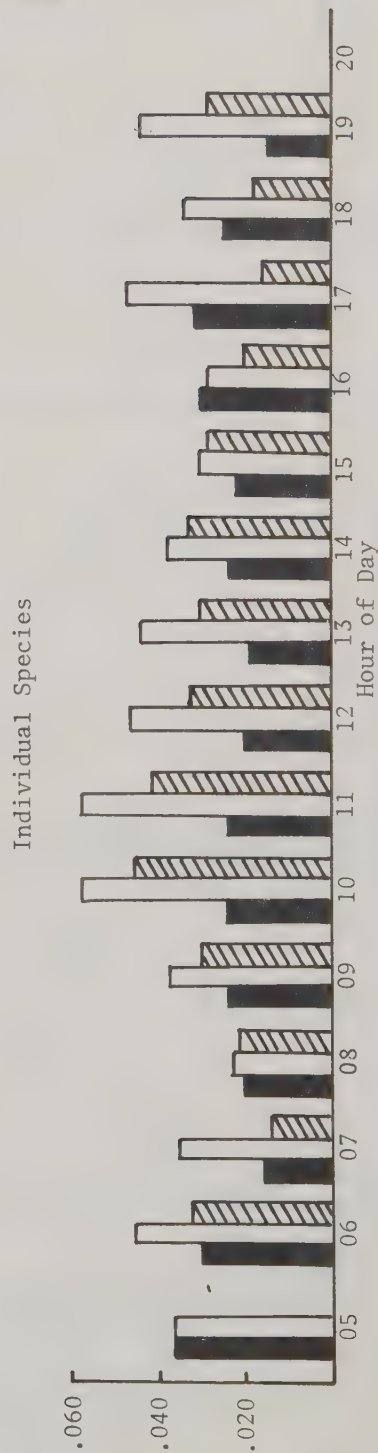
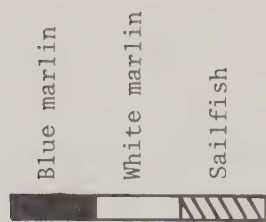
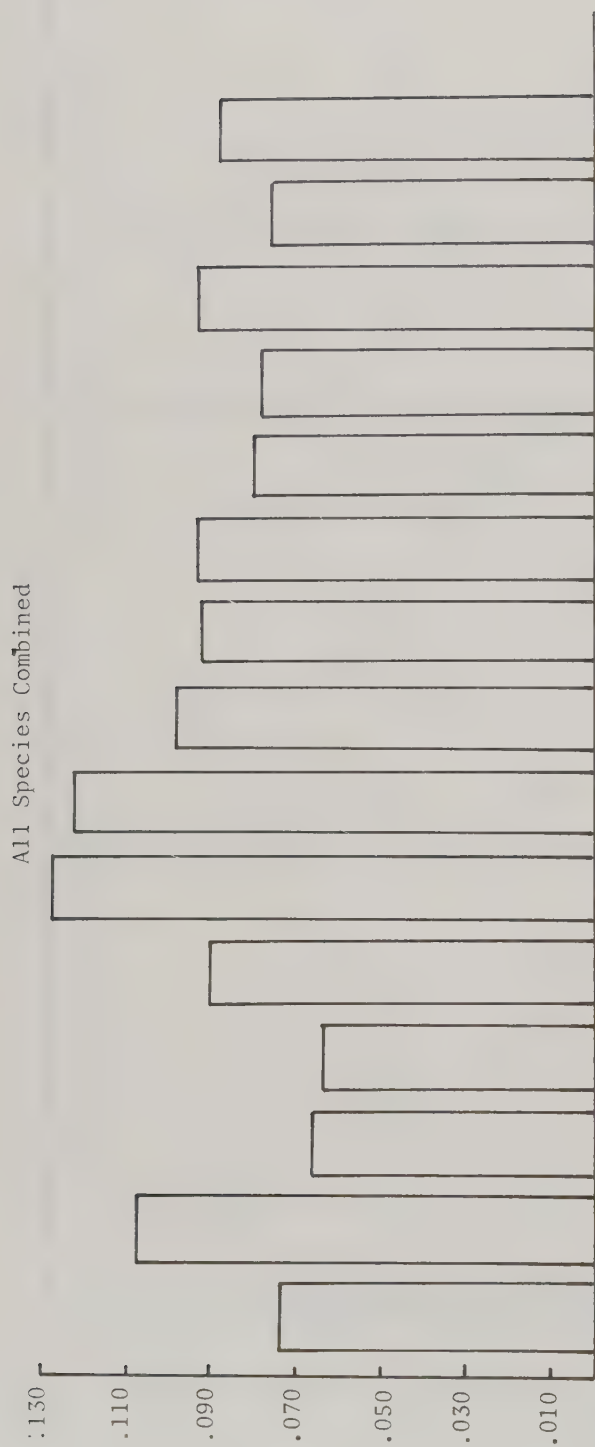


Figure 3. Number of billfishes hooked-per-hour-of-trolling by time of day in the northern Gulf of Mexico, 1971-1976.

Number of Fish Hooked-Per-Hour-of-Trolling

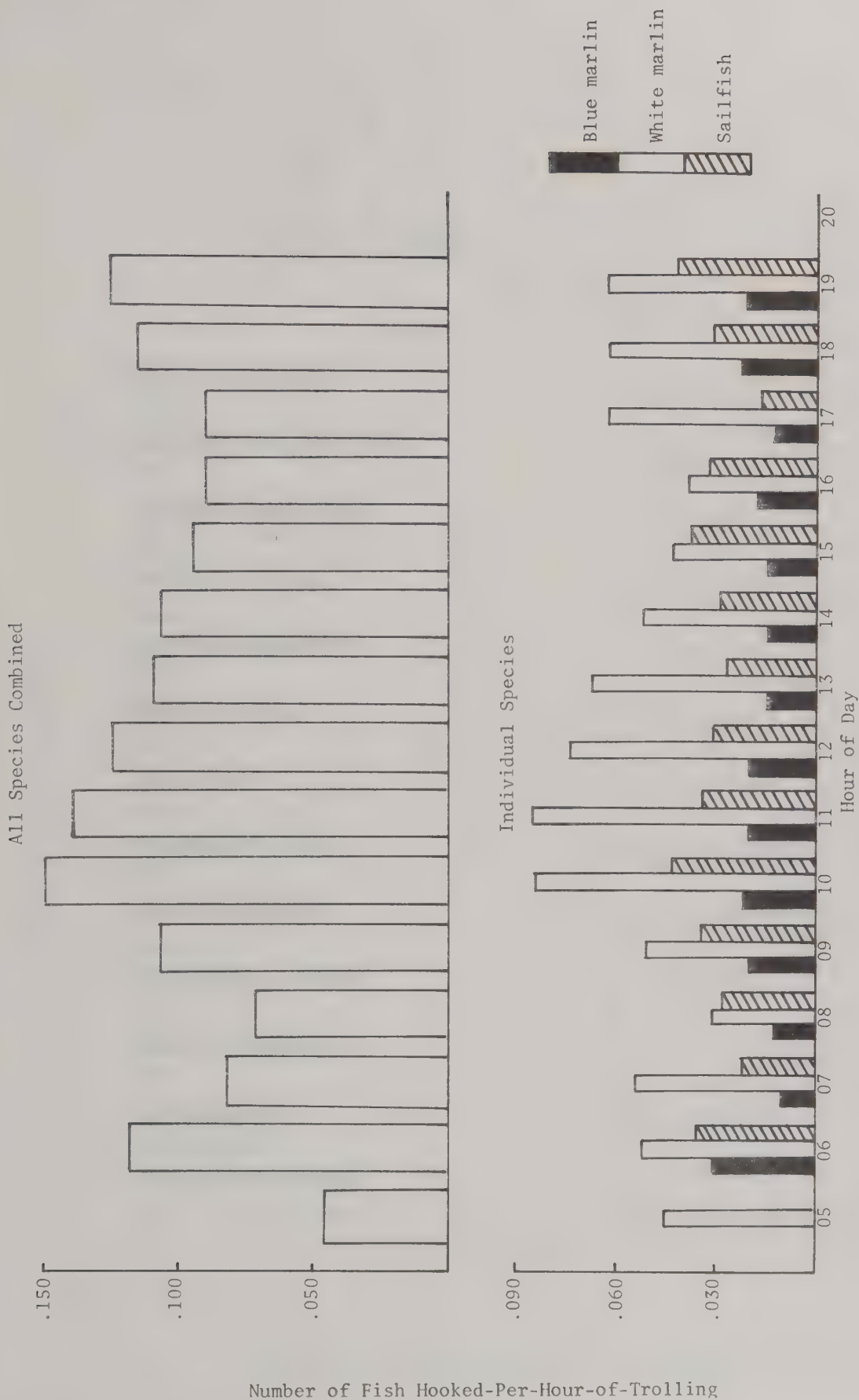


Figure 4. Number of billfishes hooked-per-hour-of-trolling by time of day in the northeastern Gulf of Mexico, 1971-1976.

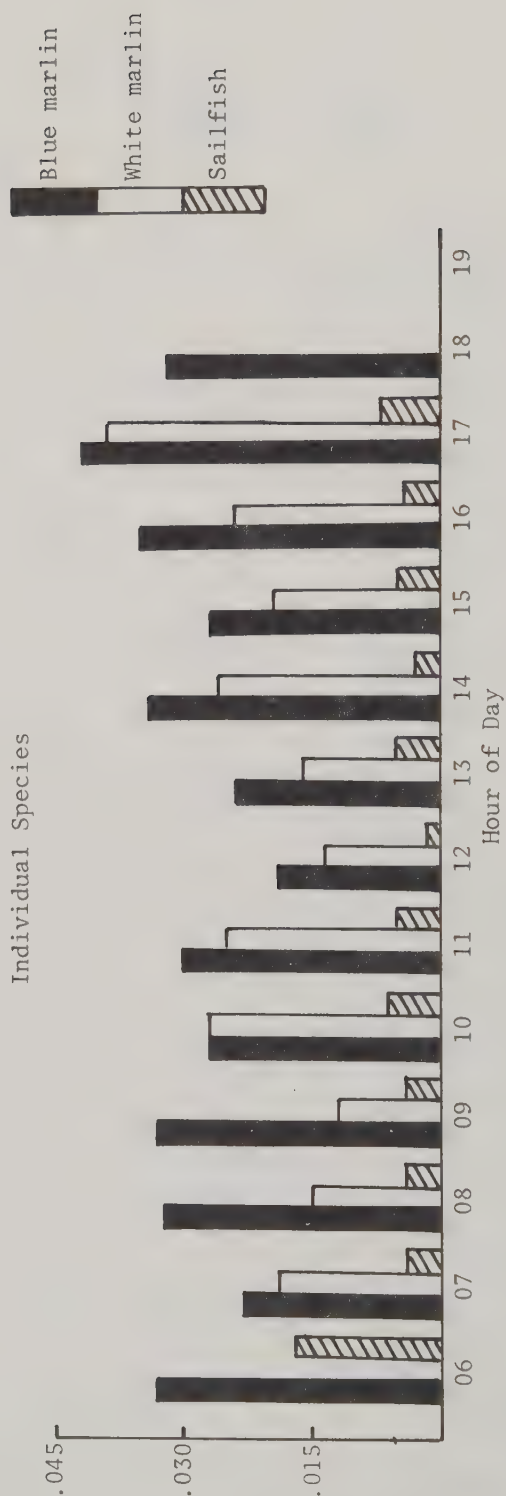
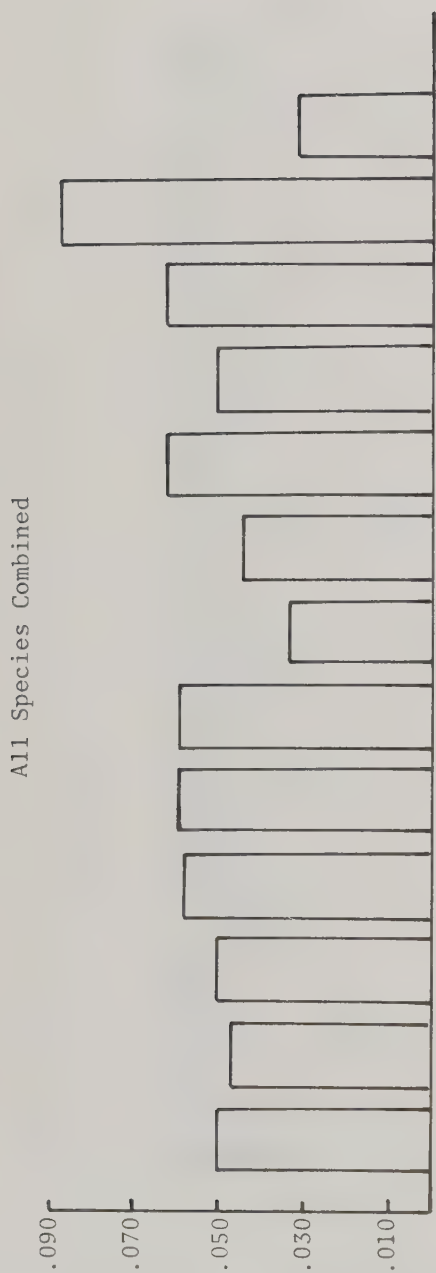


Figure 5. Number of billfishes hooked-per-hour-of-trolling by time of day in the northcentral Gulf of Mexico, 1971-1976.

Number of Fish Hooked-Per-Hour-of-Trolling

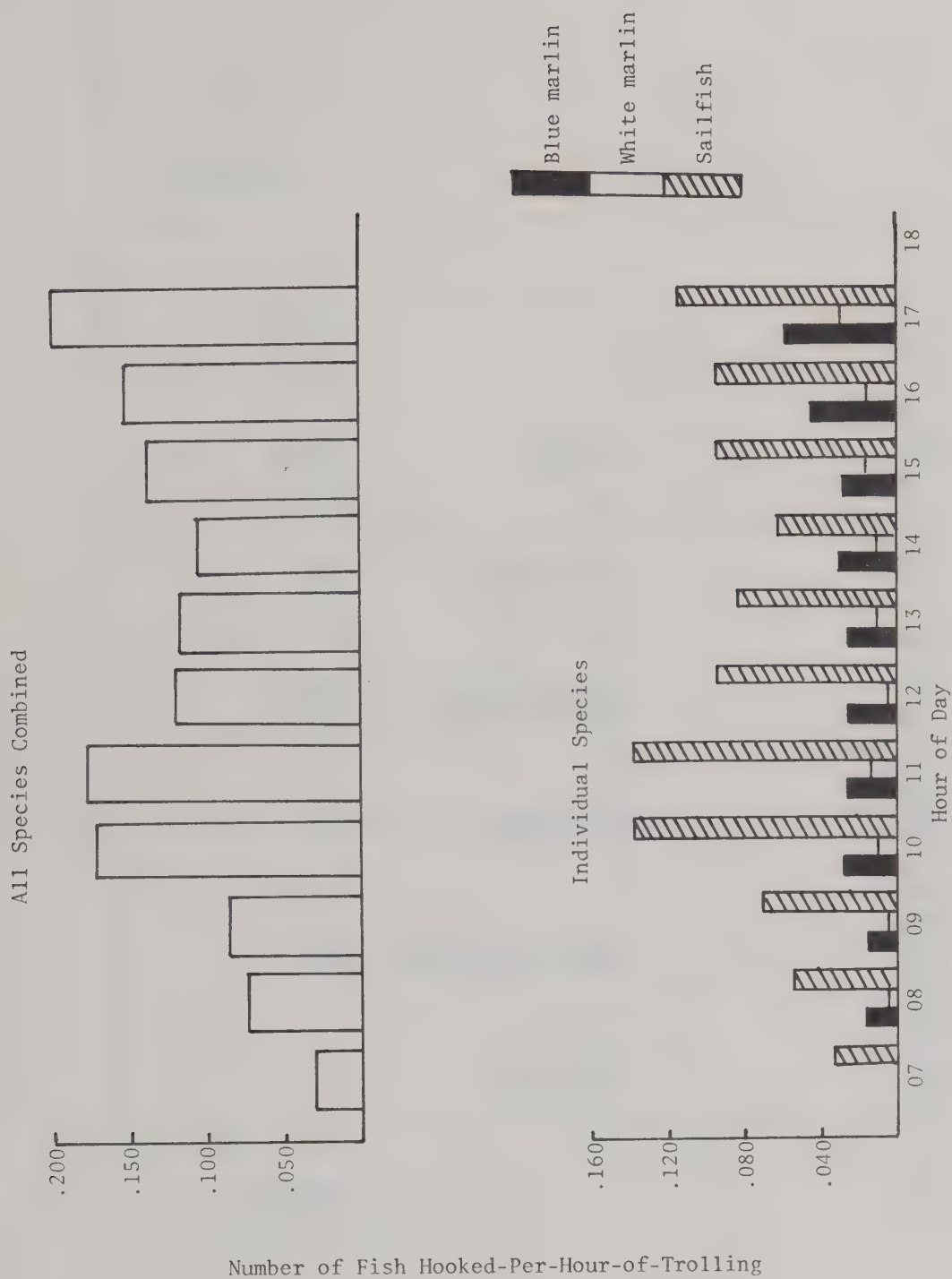


Figure 6. Number of billfishes hooked-per-hour-of-trolling by time of day in the northwestern Gulf of Mexico, 1972-1976.

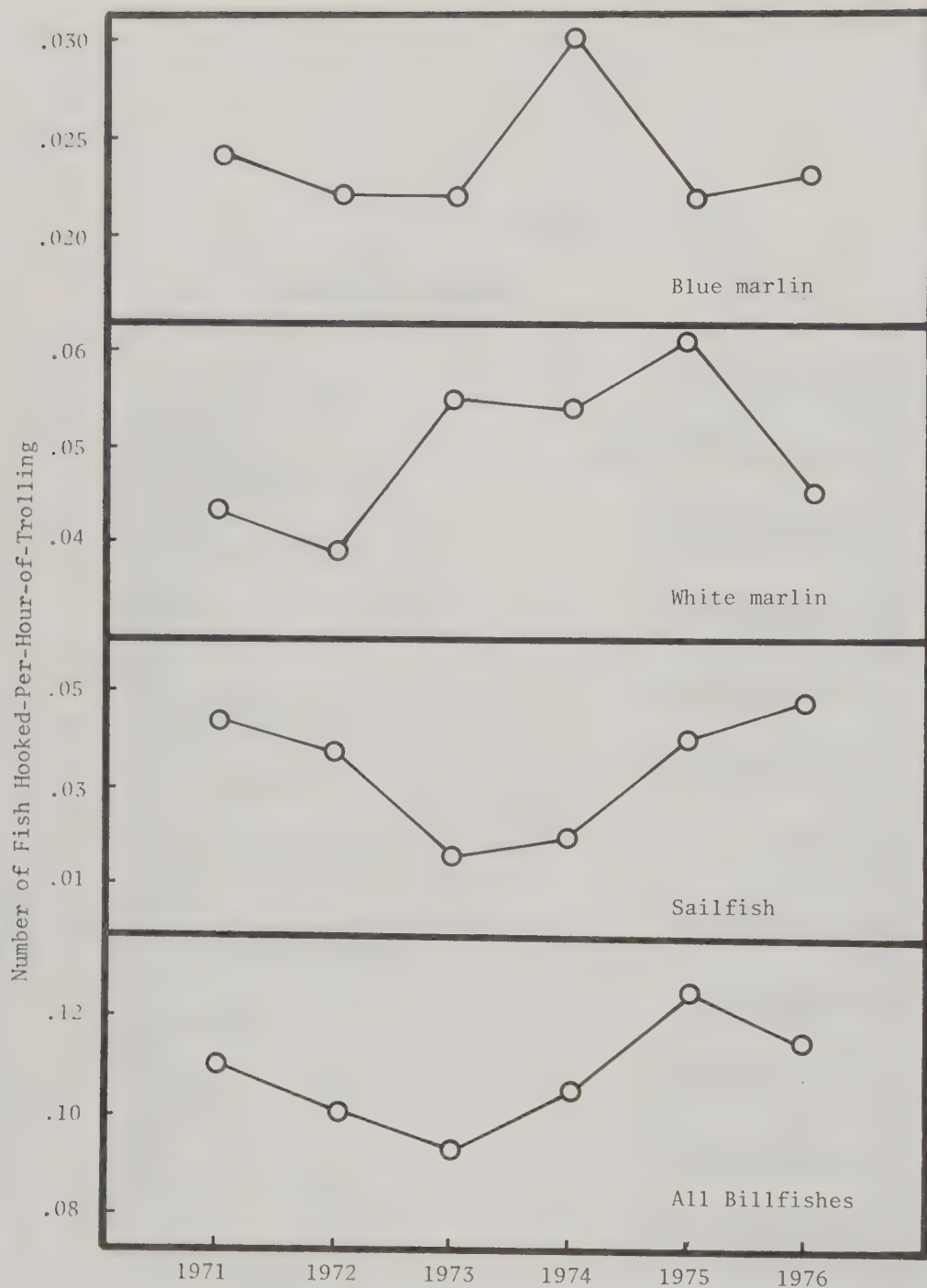


Figure 7. Number of billfishes hooked-per-hour-of-trolling in the northern Gulf of Mexico, 1971-1976.

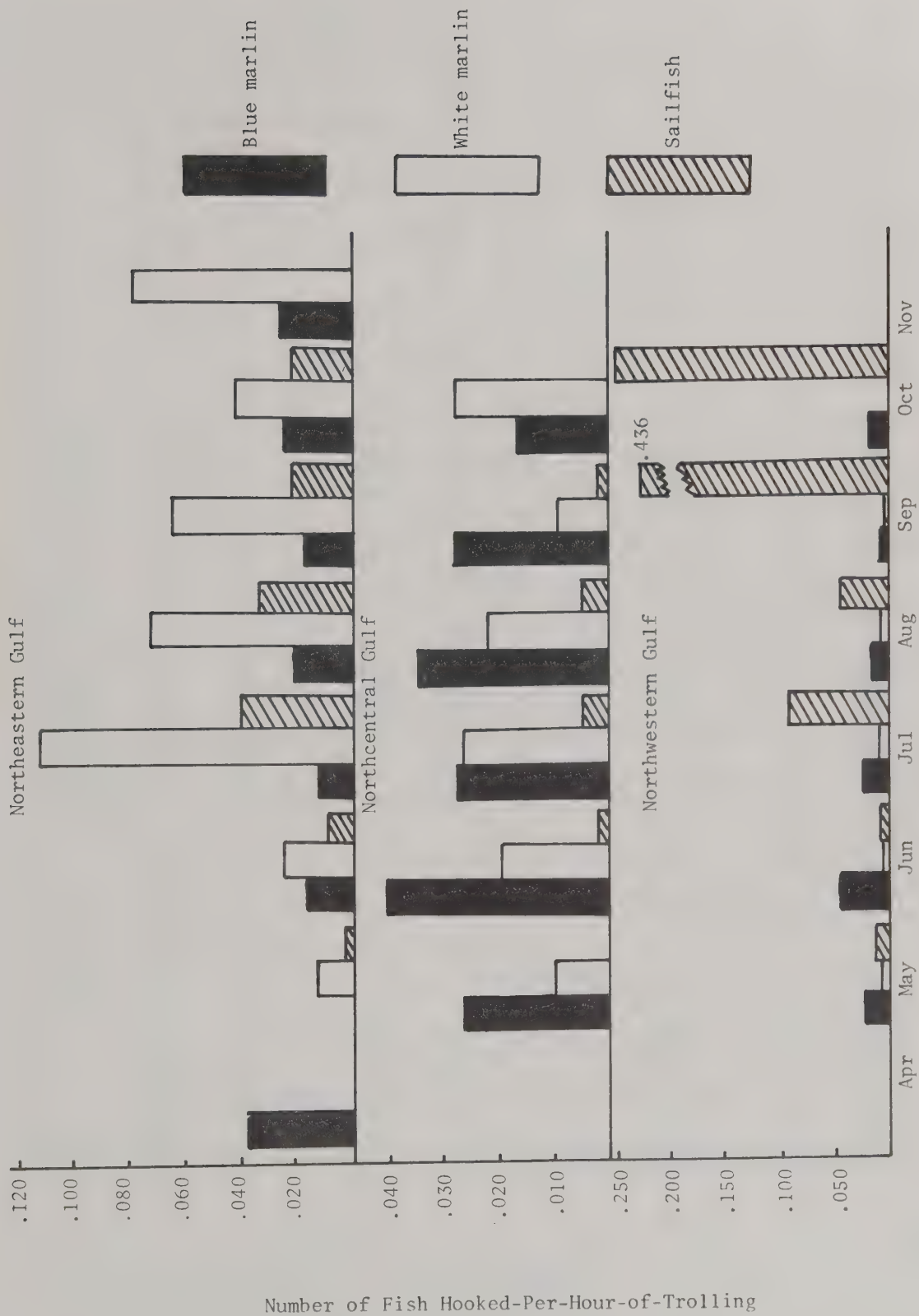


Figure 8. Number of billfishes hooked-per-hour-of-trolling by monthly periods in the northern Gulf of Mexico, 1976.

LEGEND

Fishing
area bound
by heavy
black lines.
Number
of fish
raised-per-
hour-of-
trolling:

.001-.040 
.041-.080 
≥.081 

No fish
raised in
squares
without
symbols.

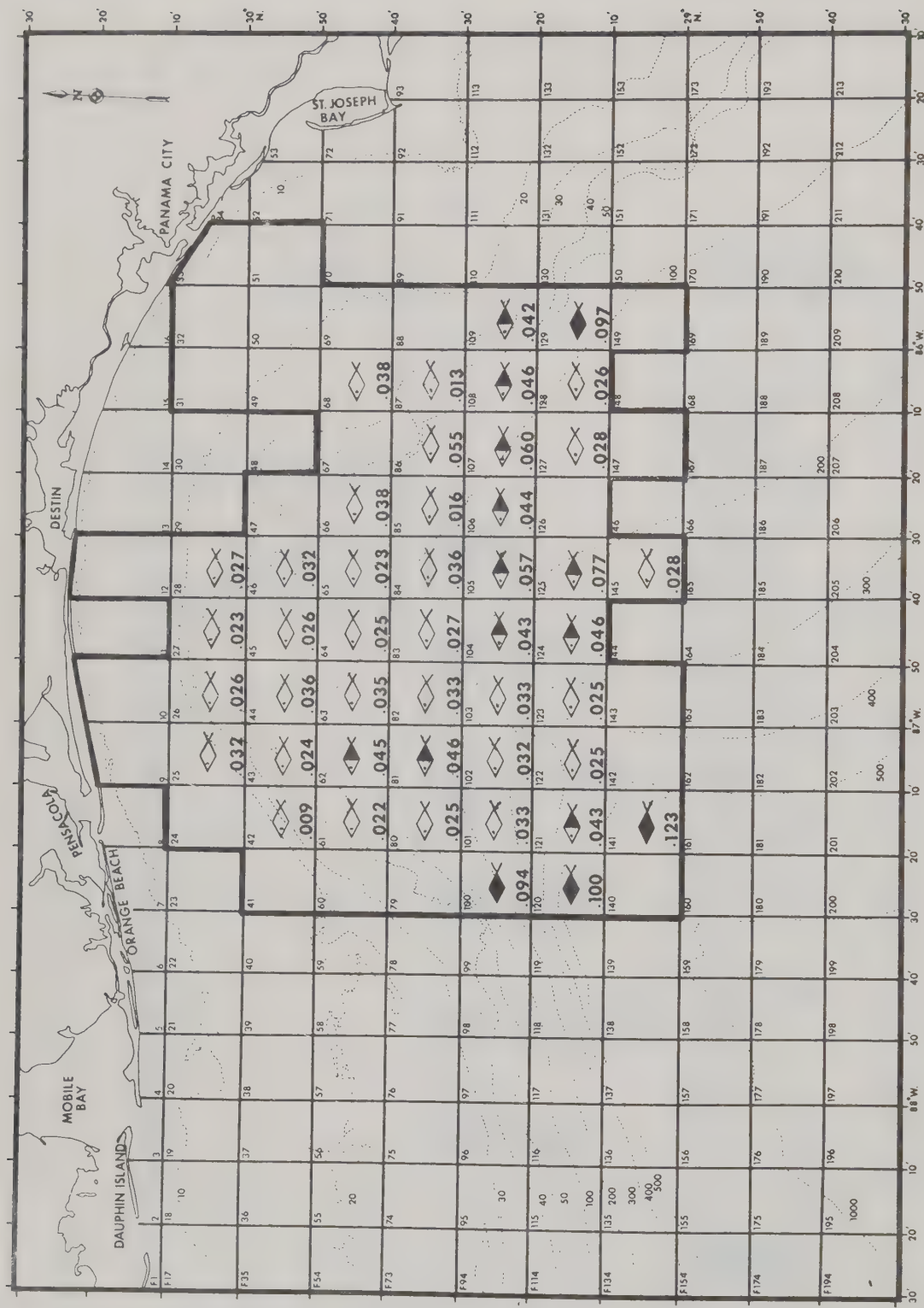
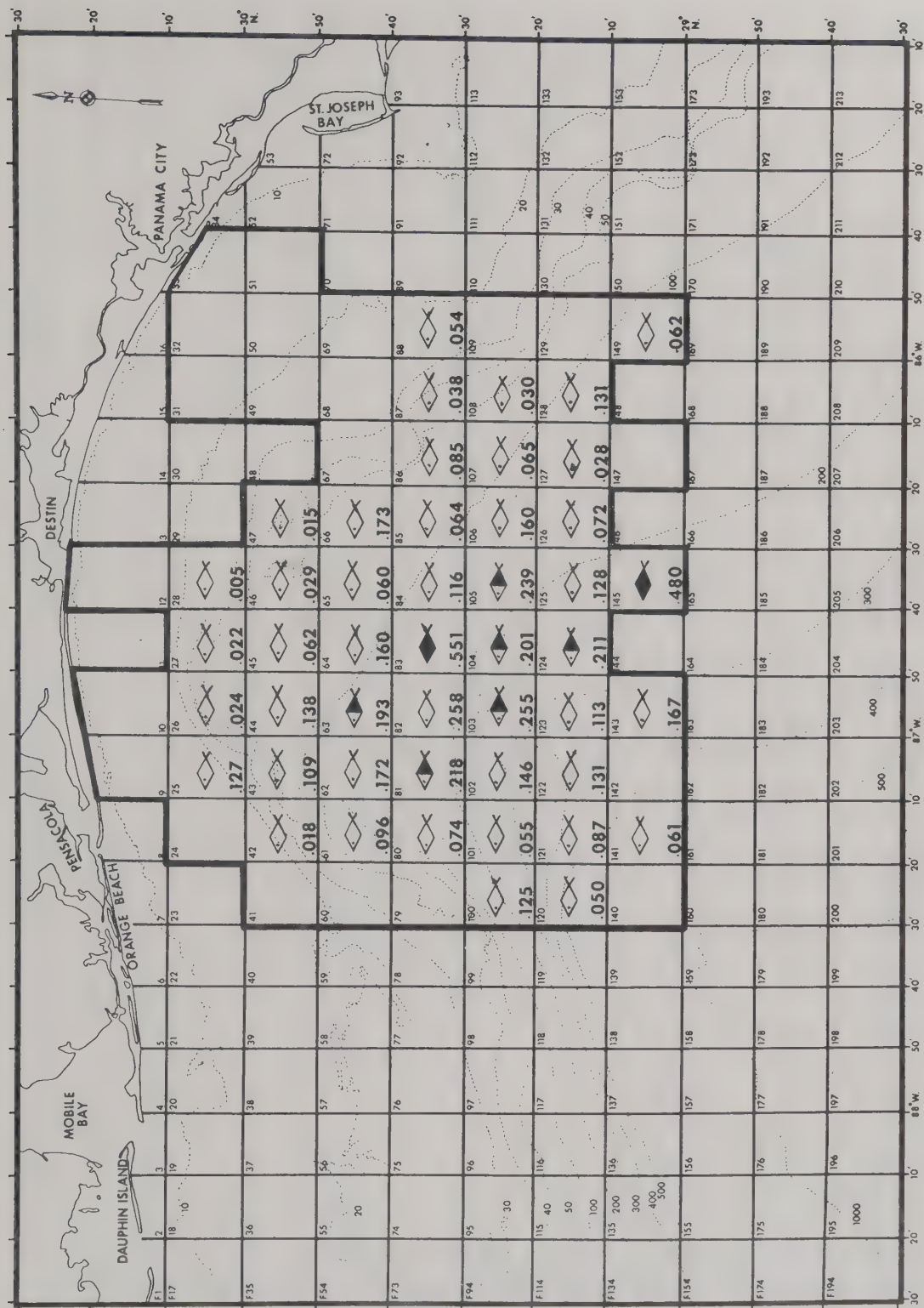


CHART 1. NUMBER OF BLUE MARLIN RAISED-PER-HOUR-OF-TROLLING IN THE NORTHEASTERN GULF OF MEXICO BY 10-MINUTE SQUARES, 1971-1976.



LEGEND

Fishing area bound by heavy black lines.

Number of fish raised-per-hour-of-trolling:

.001-.180

.181-.360

≥361

No fish raised in squares without symbols.

CHART 2. NUMBER OF WHITE MARLIN RAISED-PER- HOUR-OF-TROLLING IN THE NORTHEASTERN GULF OF MEXICO BY 10-MINUTE SQUARES, 1971-1976.

LEGEND

Fishing area bound by heavy black lines.

Number of fish raised-per-hour-of-trolling:

- .001-.089
- .090-.179
- ≥ .180

No fish raised in squares without symbols.

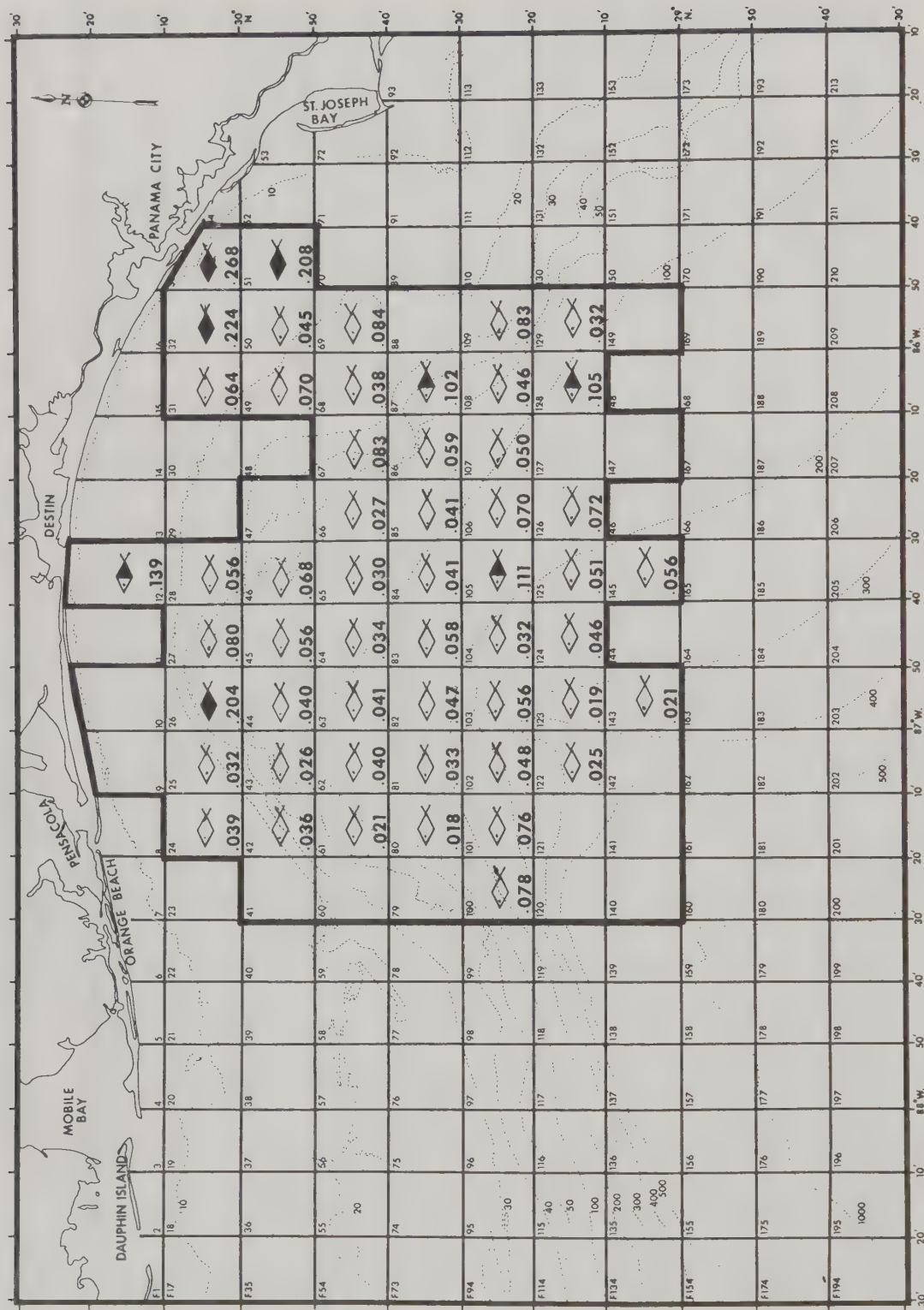
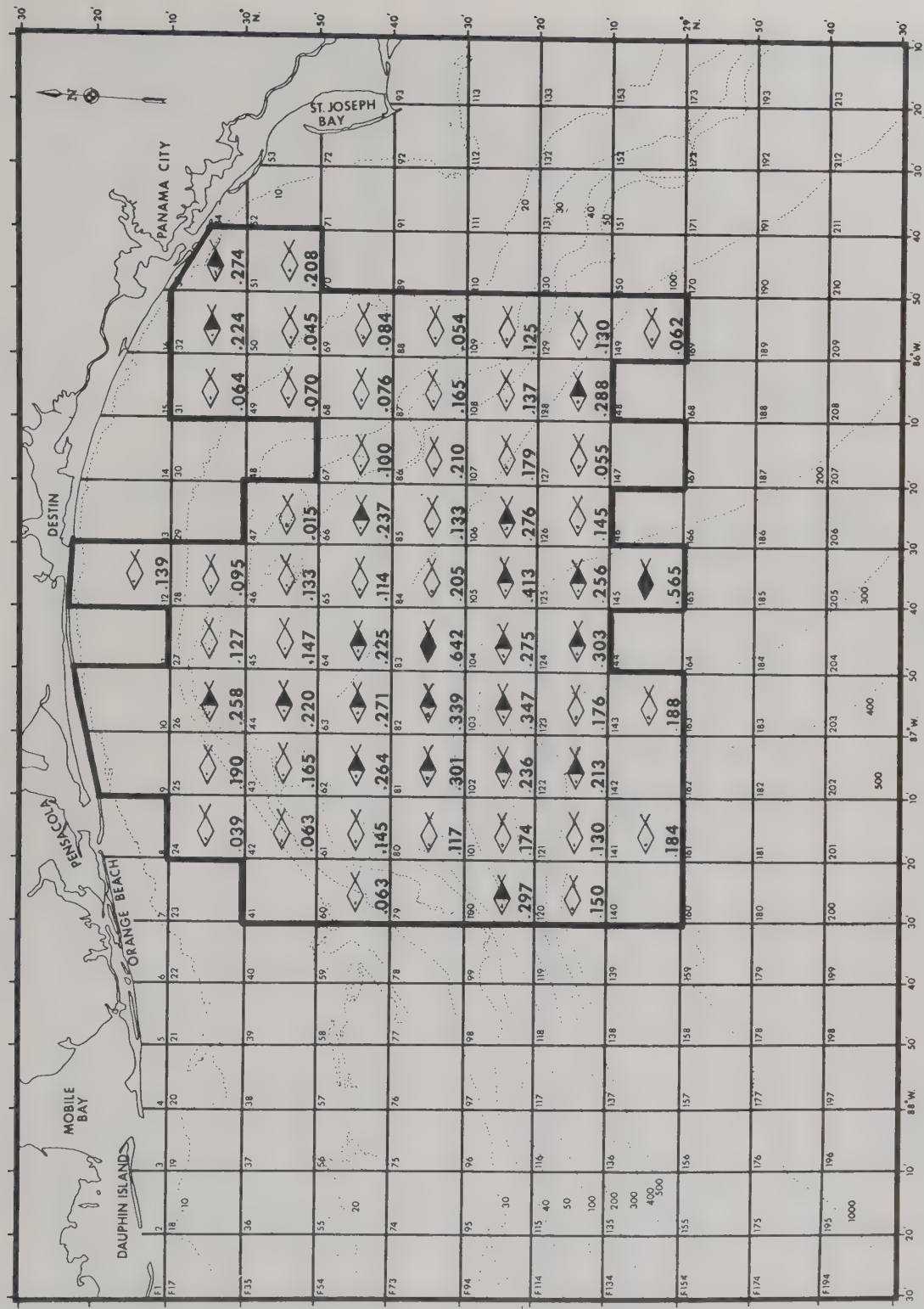


CHART 3. NUMBER OF SAILFISH RAISED-PER-HOUR-OF-TROLLING IN THE NORTHEASTERN GULF OF MEXICO BY 10-MINUTE SQUARES, 1971-1976.



LEGEND

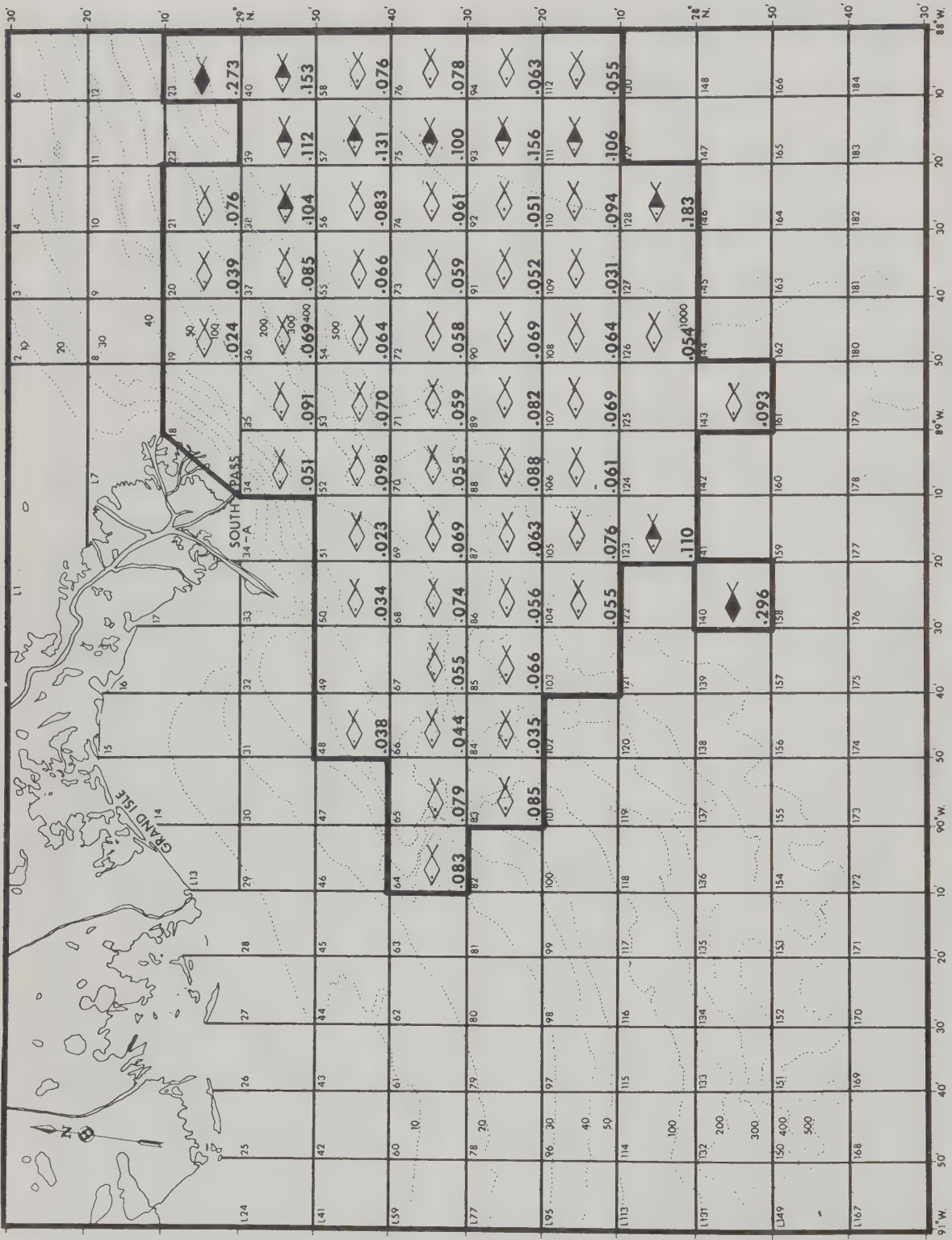
Fishing area bound by heavy black lines.

Number of fish raised-per-hour-of-trolling:

- 001-210
- 211-420
- 421

No fish raised in squares without symbols.

CHART 4. NUMBER OF BILLFISHES RAISED-PER-HOUR-OF-TROLLING IN THE NORTHEASTERN GULF OF MEXICO BY 10-MINUTE SQUARES, 1971-1976.



LEGEND

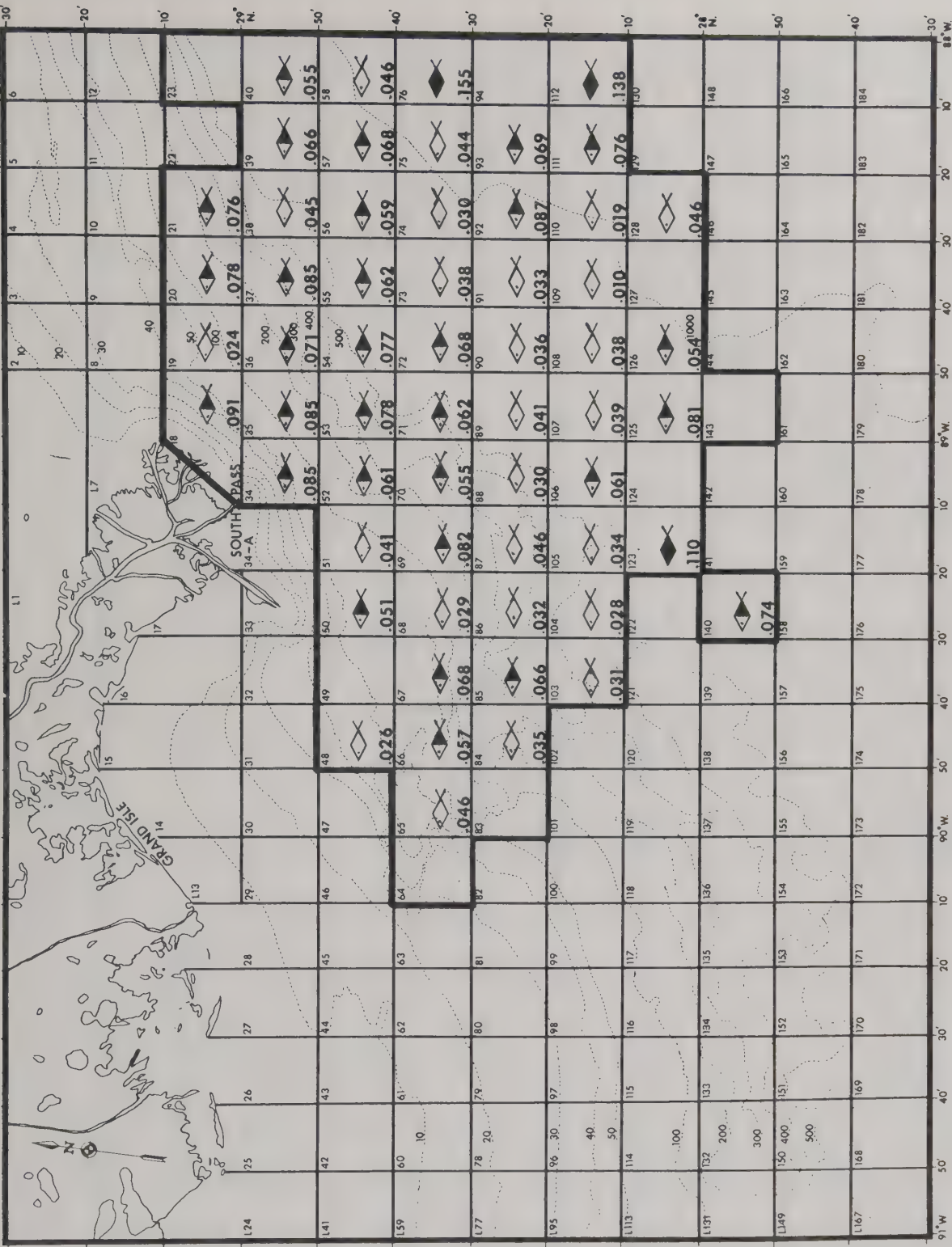
Fishing area bound by heavy black lines.

Number of fish raised-per-hour-of-trolling:

- 001-099
- 100-199
- ≥ 200

No fish raised in squares without symbols.

CHART 5. NUMBER OF BLUE MARLIN RAISED-PER-HOUR-OF-TROLLING IN THE NORTHCENTRAL GULF OF MEXICO BY 10-MINUTE SQUARES, 1971-1976.



LEGEND

Fishing area bound by heavy black lines.

Number of fish raised-per-hour-of-trolling:

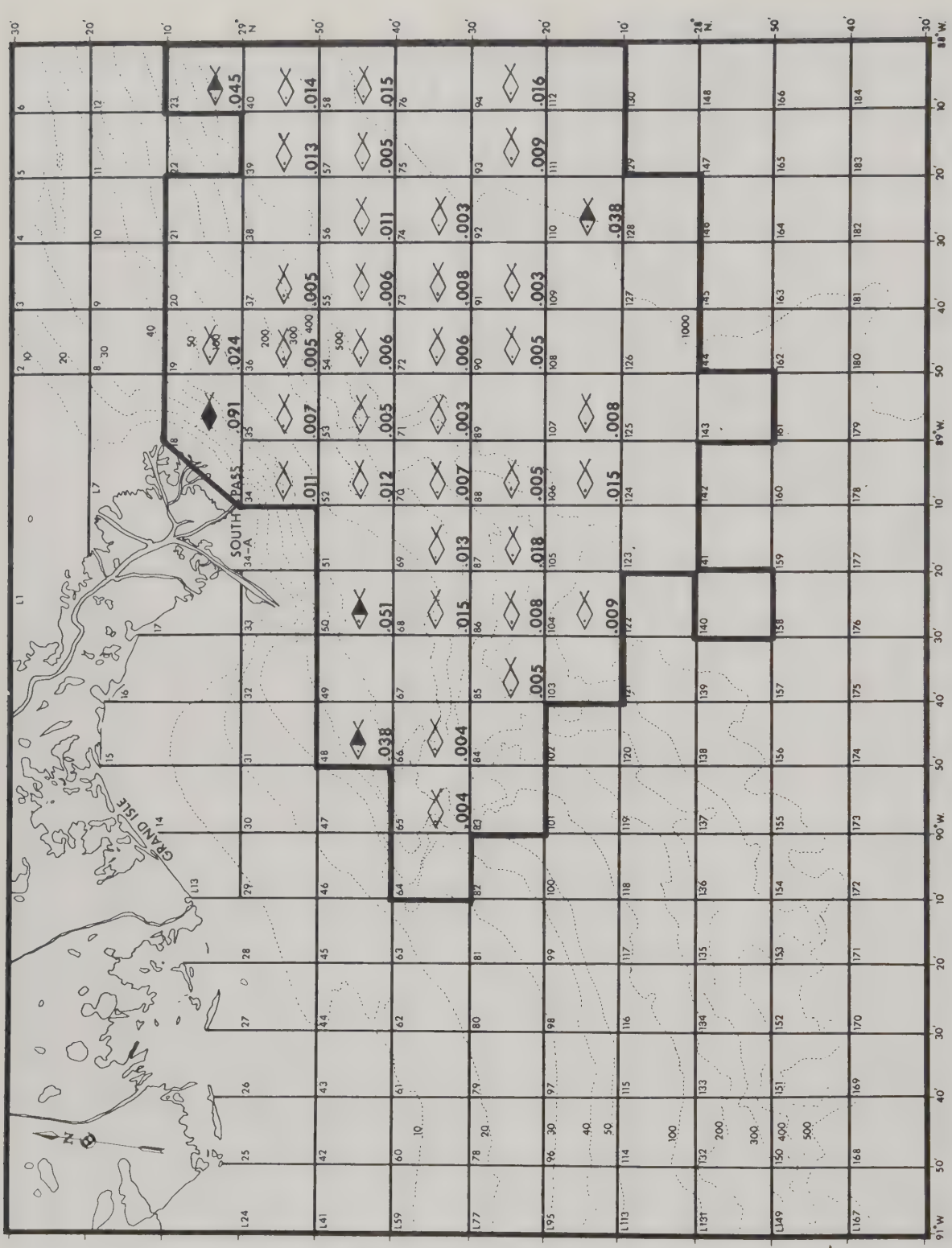
0.01-.050

0.051-.100

≥ .101

No fish raised in squares without symbols.

CHART 6. NUMBER OF WHITE MARLIN RAISED-PER-HOUR-OF-TROLLING IN THE NORTH-CENTRAL GULF OF MEXICO BY 10-MINUTE SQUARES, 1971-1976.



LEGEND

- Fishing area bound by heavy black lines.
- Number of fish raised-per-hour-of-trolling:
 - 0.01-0.30
 - 0.31-0.60
 - ≥ 0.61
- No fish raised in squares without symbols.

CHART 7. NUMBER OF SAILFISH RAISED-PER-HOUR-OF-TROLLING IN THE NORTHCENTRAL GULF OF MEXICO BY 10-MINUTE SQUARES, 1971-1976.

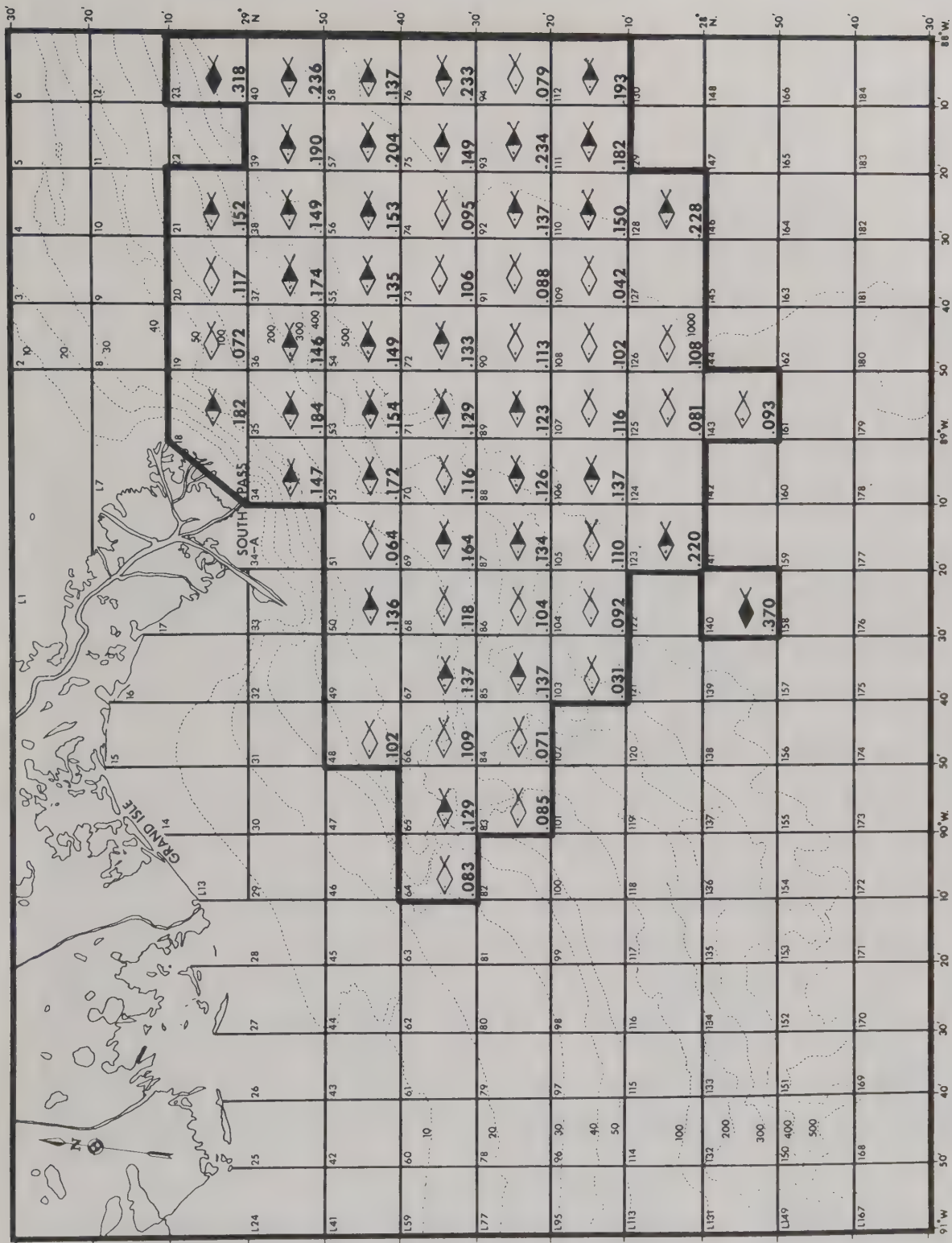
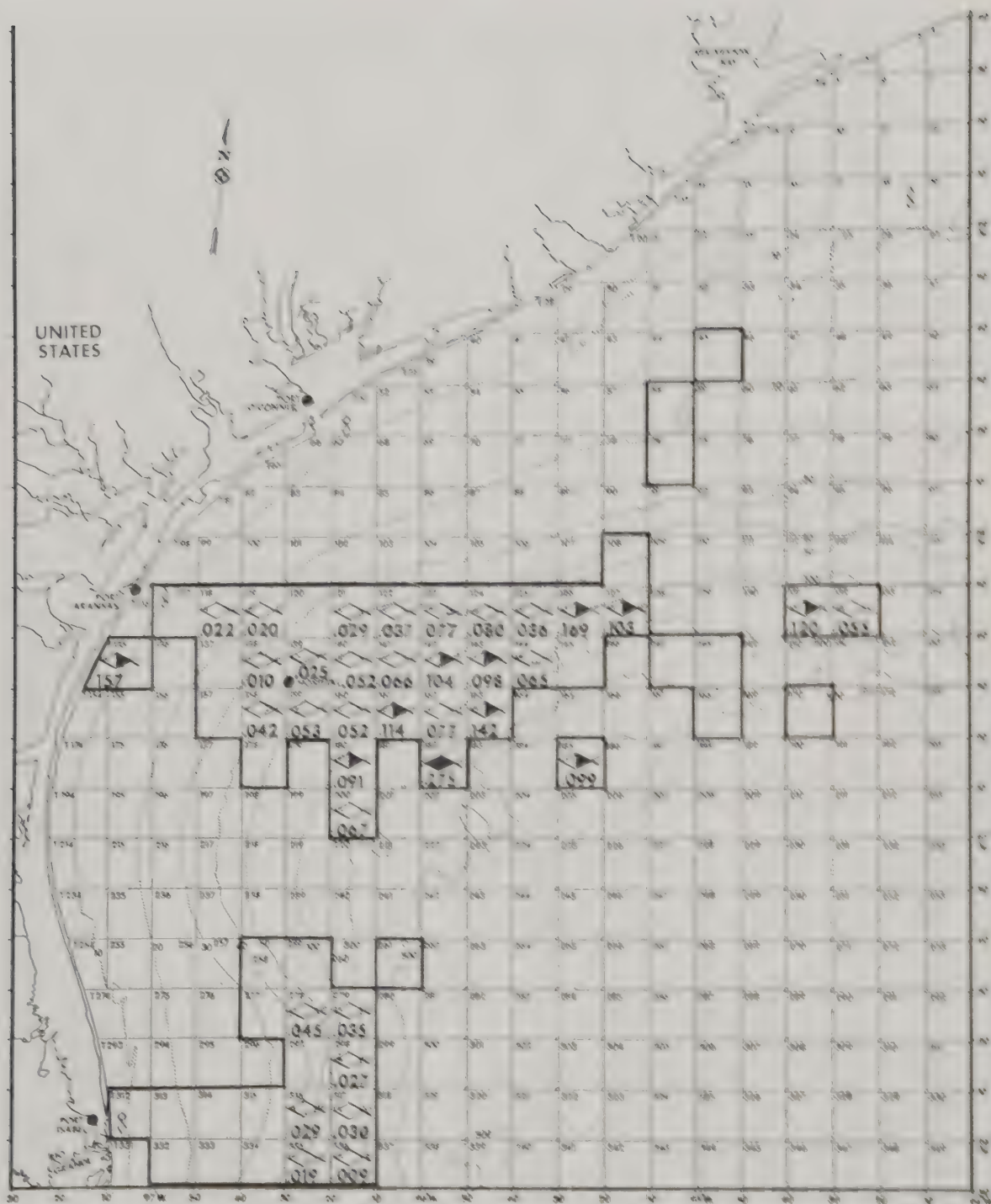


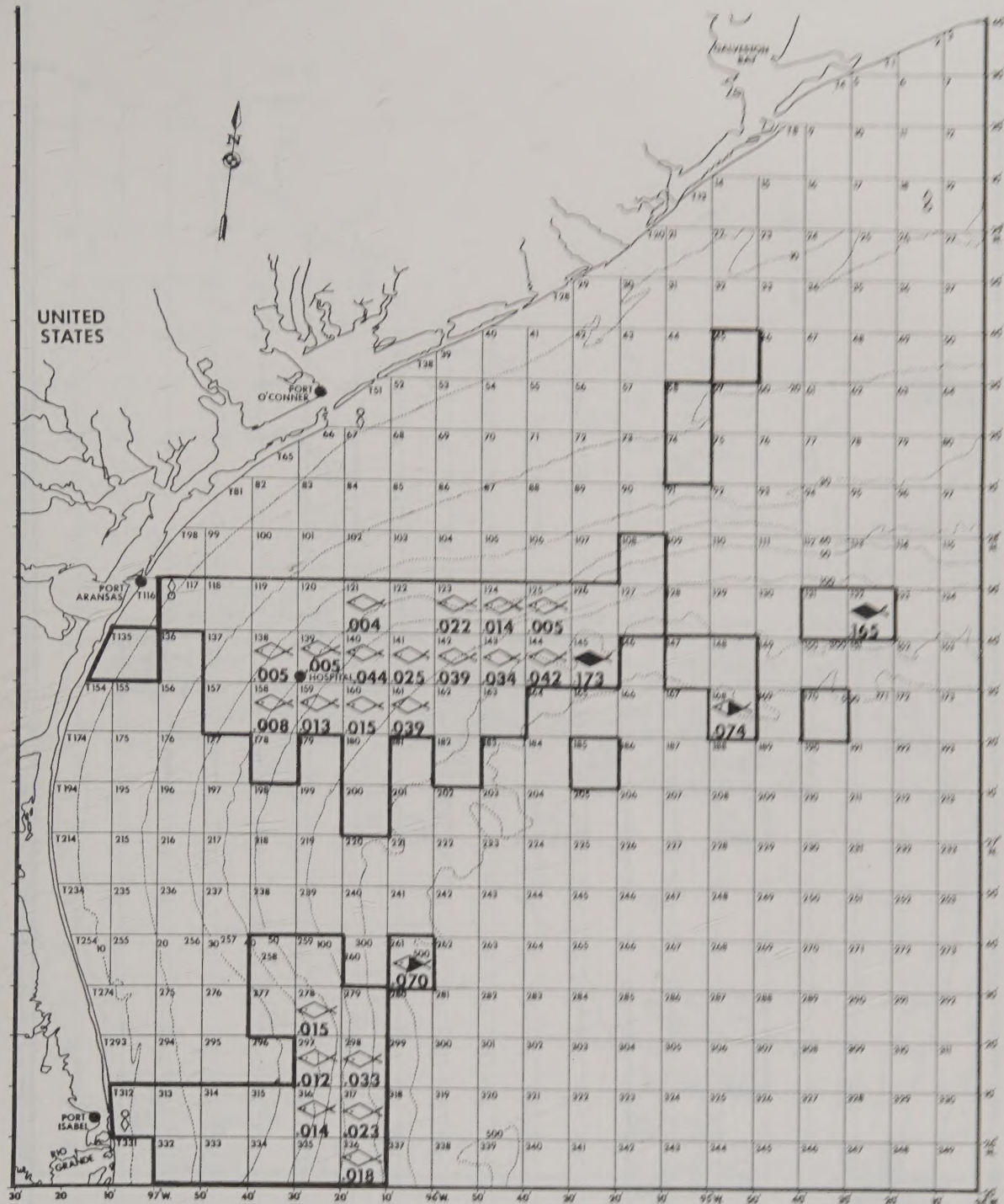
CHART 8. NUMBER OF BILLFISHES RAISED-PER-HOUR-OF-TROLLING IN THE NORTHCENTRAL GULF OF MEXICO BY 10-MINUTE SQUARES, 1971-1976.



L Fishing areas
 E Bound by heavy
 G black lines.
 E No fish raised
 N in squares
 D without symbols.

▲ 0.001-0.000 fish raised-per-hour-of-trolling.
 ◆ 0.001-180 fish raised-per-hour-of-trolling.
 ◆ 2,181 fish raised-per-hour-of-trolling.

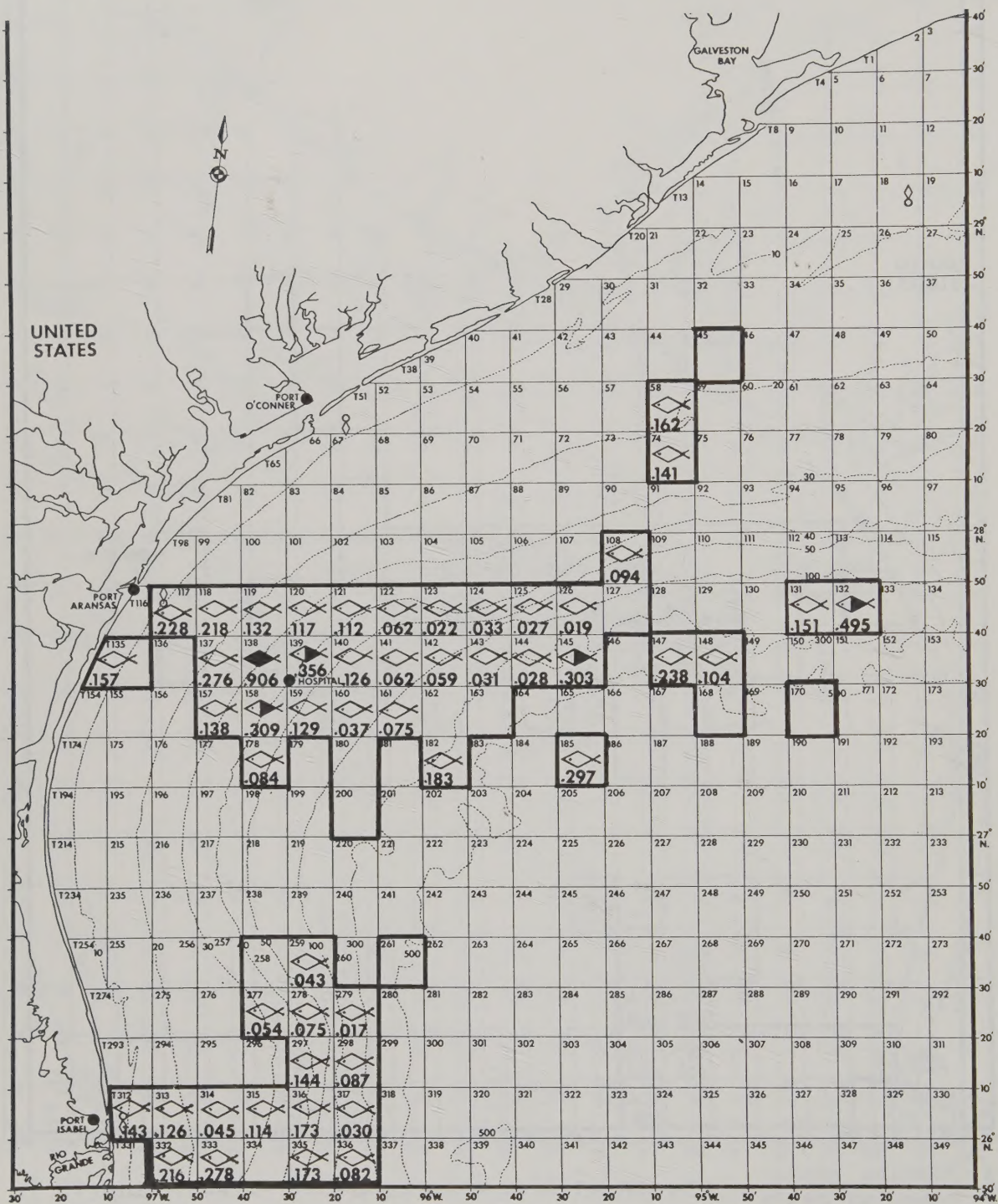
CHART 9. NUMBER OF FISH RAISED PER HOUR OF TROLLING IN THE
 NORTHWESTERN GULF OF MEXICO BY 10-MINUTE SQUARES, 1972-1976.



L Fishing areas
 E bound by heavy
 G black lines.
 E No fish raised
 N in squares
 D without symbols.

⚭ .001-059 fish raised-per-hour-of-trolling.
 ⚭ .060-119 fish raised-per-hour-of-trolling.
 ⚭ ≥120 fish raised-per-hour-of-trolling.

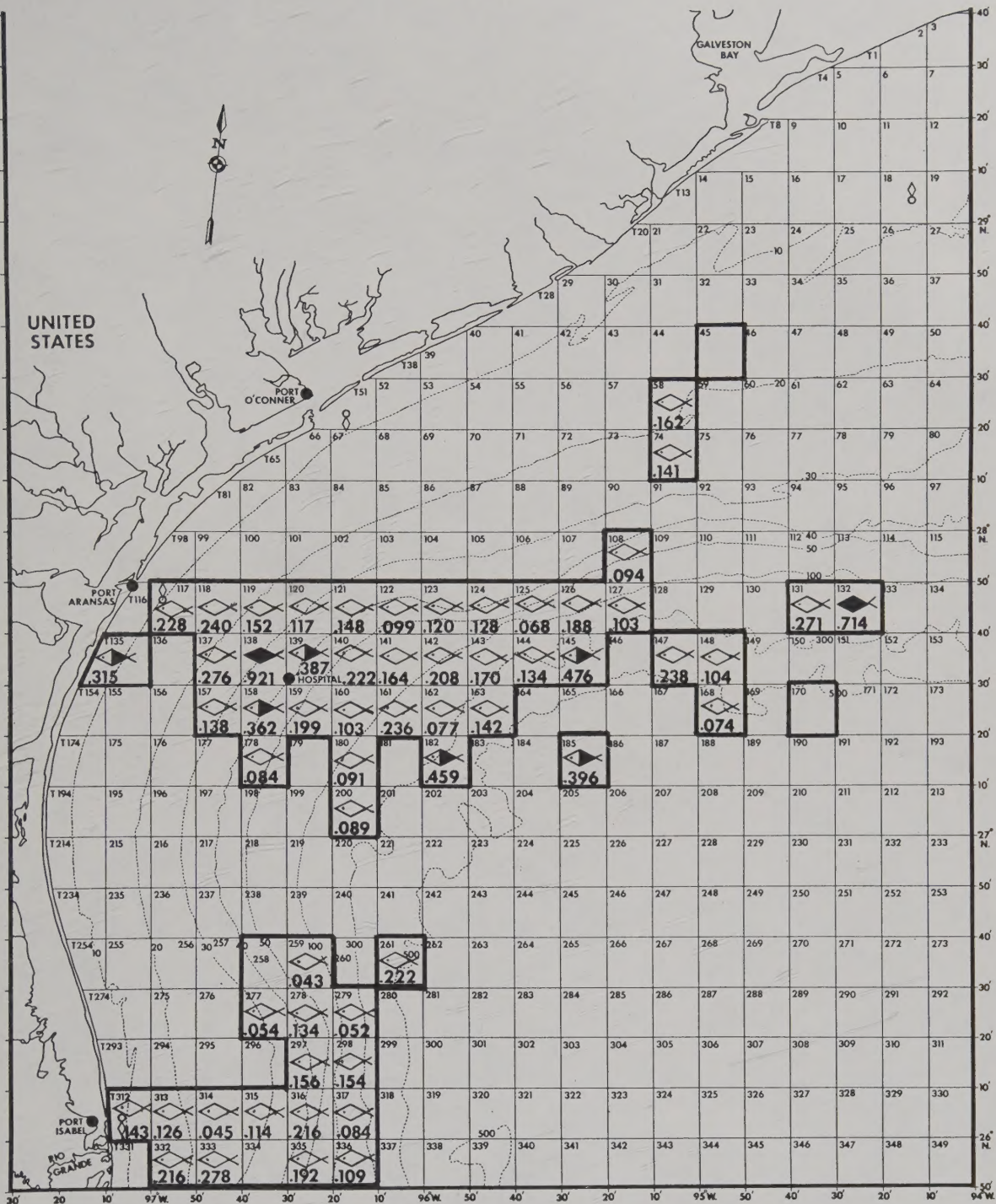
CHART 10. NUMBER OF WHITE MARLIN RAISED-PER-HOUR-OF-TROLLING IN THE NORTHWESTERN GULF OF MEXICO BY 10-MINUTE SQUARES, 1972-1976.



L Fishing areas
 E bound by heavy
 G black lines.
 E No fish raised
 N in squares
 D without symbols.

◇ .001-300 fish raised-per-hour-of-trolling.
 ▲ 301-600 fish raised-per-hour-of-trolling.
 ■ ≥601 fish raised-per-hour-of-trolling.

CHART 11. NUMBER OF SAILFISH RAISED-PER-HOUR-OF-TROLLING IN THE NORTHWESTERN GULF OF MEXICO BY 10-MINUTE SQUARES, 1972-1976.



L	Fishing areas	◇	.001-309	fish raised-per-hour-of-trolling.
E	bound by heavy	◇	.310-619	fish raised-per-hour-of-trolling.
G	black lines.	◆	≥ 620	fish raised-per-hour-of-trolling.
E	No fish raised			
N	in squares			
D	without symbols.			

CHART 12. NUMBER OF BILLFISHES RAISED-PER-HOUR-OF-TROLLING IN THE NORTHWESTERN GULF OF MEXICO BY 10-MINUTE SQUARES, 1972-1976.

